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New Year's Resolution for Every Member



Resolved:

That in 1912 I pledge myself to secure at least one new member, to the end that our membership may be doubled, our influence extended, our power for good increased, and the importance of the work the Association is doing be more deeply impressed upon the minds of the great American public.



VIEW OF THE WESTERN SHORE OF LAKE DRUMMOND, DISMAL SWAMP.

American Forestry

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THE NATIONAL ASPECT OF SWAMP DRAINAGE*

By M. O. LEIGHTON,

CHIEF HYDROGRAPHER UNITED STATES GEOLOGICAL SURVEY.

THAT which I have to suggest is based on two fundamental principles; first, that natural laws are superior to man-made ones, and when the two kinds are opposed, as they sometimes are, man is very foolish to handicap himself by trying to sustain those of his own make; second that government is merely a means to an end, that end being to enable the people to satisfy their needs and desires in the wisest way. I hold that these two principles do not admit of argument.

Some parts of the earth are not, in their natural condition, well suited to man's occupancy. Man has therefore seen fit to readjust the face of nature to suit his particular needs. In the course of this readjustment he has changed rural conditions into urban ones, has diverted the course of rivers to make the arid places productive, has tunneled mountains, bridged chasms, leveled hills, and even diked off the ocean itself. These and a thousand things more has man performed because nature has not arranged and constructed to his liking. But though nature has shown a cheerful disposition to submit to such changes, she has always insisted that they be made in certain ways. Whosoever violates her laws must finally fail of his purposes. Do you know of any exception to this rule?

This great Congress, of notable record and honorable achievement, typifies the discontent of man with certain of nature's desert conditions. To remedy these, this Congress has advocated the diversion of waters from their natural courses in order that arid land may be made to produce. It is fitting that, having seen this proposition gaining headway at every milestone, with ultimate success as inevitable as the round of the seasons, this Congress should now, with that helpfulness and altruism that has marked its every act, lend a part of its energy toward the conversion of another great natural blot into a place of American homes and fertile fields so that the East and the West, the North and the South may unite in that inspiring demand of the Irrigation Congress, "Make homes on the land."

*From address delivered at Irrigation Congress in Chicago, in December.

The natural blot of which I speak is made up of the swamp lands of the United States. As a nation we require the riches that lie disguised in them. As a people we can not feel that our full duty has been performed until we have made these swamp lands centers of prosperity and comfort for ourselves and those who shall come after. To do this we must again change the face of nature and we must make that change in accordance with nature's laws.

THE CHARACTER OF A SWAMP

What is a swamp? It is merely an area of land which because of some adverse natural conditions, has been deprived of or denied a suitable outlet for its surplus water. That water therefore accumulates in or upon the ground and renders the area too wet for man's comfortable occupation. It also prevents the entrance of air into the ground. Now, air, or the oxygen contained in air, is as essential at the plant roots as it is at the plant leaves, and so it is that in swamps we have a dense wet soil generally stagnant, on which nothing of a very useful character will grow except certain kinds of timber. Food crops, on which we depend for sustenance, can not grow in such soil.

In the case of naturally well drained land nature has provided suitable water outlets at proper grade. In the case of the swamp she has left this undone and the whole function of man in reclaiming swamp lands is to supply that which nature has neglected. In supplying that need, in remedying that defect, we must be governed by precisely the same laws that nature followed with respect to lands that receive here complete attention. Look at any well-drained river basin, you will find that the main stream and its tributaries are harmoniously adjusted to each other with respect to width, depth, and slope. That portion of the channel in the lower valley has a capacity sufficient to safely carry off the water that may come from the entire drainage area. The small creeks high up on the divide are taken into account in adjusting that capacity. Where one part of a river system joins another part the channel below the junction of the two streams is of the right size to carry the waters of both. There is harmony and unity and an undeviating fitness of all things in the basin.

Supposing, now, it should occur that the upper part of the basin did not harmonize with the lower part? Supposing, for example, that the upper part were well drained and the lower part poorly drained—what would occur? A proper answer to this question is furnished by the great Mississippi Valley itself. Much of its upper portion is well drained, while its lower part is a flat delta region. The result is a great overflowed and swampy country from Cape Girardeau to the Gulf. Look at the Kankakee basin over in Indiana. Just being awakened after the sleep of centuries. Look at that enormous wheat area in the valley of the Red River of the North, and that vast rich bottom of the Tombigbee in Mississippi and Alabama. These are the very conditions that we are trying to correct by artificial drainage. Yet, in many of our drainage schemes we are endeavoring to perpetuate the very procedure which in nature resulted in swamp conditions.

In numerous places we are draining the upper portions of swamps without providing suitable outlets for water in the lower portions. This process not only makes the drainage works less effectual than they would otherwise be, but it also accentuates the swamp conditions in the lands below.

THE PROBLEM OF DRAINAGE

Artificial drainage creates new conditions. In its natural state a swamp gives up its water slowly. If that were not so, the land would not be swamp land. The rivers draining that swamp are accustomed to receive the water only at the rate at which the swamp gives it up, therefore those rivers have through long ages become habituated to receive water at that rate and at no greater rate. Therefore, when we drain wet land, it can not be sufficient to dig ditches through a great area and discharge the water into streams that are not adapted to that increased rate of flow. In rational drainage it is necessary to consider the whole basin—the hill land as well as the low land, and the drainage system must be fashioned with due regard for every part. The necessities differ in no essential degree from those of a sewerage system of any city. No one would think of building the upper end of the system without regard to the lower end, nor of dividing the problem up into districts to conform, for example with city ward lines, and constructing each without regard to the other. In laying out a city sewerage system we must at the outset design each portion, from outlet to highest point, so that when the whole is eventually completed it will become an harmonious drainage work. The same plan is demanded in swamp drainage. Whether the swamp be one mile or one thousand miles long, it must, if included within a single river system, eventually be reclaimed as a unit. Of course this does not apply to coastal marshes like those of Louisiana, where the logical process is to dike off lands and to pump the surplus water into canals that discharge directly into the ocean. It applies, however, to by far the greater area of our swamps, where the reclamation must be accomplished by gravity drainage into natural streams already established. In such cases those natural streams must be enlarged and adjusted as far down their courses as is necessary, and even at times to their ultimate reaches.

That is the way Nature drains—that is the way we must do it. The laws governing drainage differ widely from those governing irrigation. In the latter we must decide how much land can be irrigated with a certain amount of water. We can conduct the water on the land we designate and can leave neighboring lands out of consideration if we choose to do so. This can not be done in drainage work. In a swamp the water is already there. We take it out by digging gravity canals and lowering the water table. We can not define offhand the extent of land that is to be benefited by that canal. The extent of the benefit depends on natural soil conditions, and the influence exerted by a drainage canal may be narrow or it may be wide. If a drainage district, for example, recognizing that it must provide a suitable outlet for the surplus water that it discharges from the district, enlarges the natural channel or digs a new one beyond the district boundaries far down to a remote point at which a suitable outlet is provided, that channel will benefit by

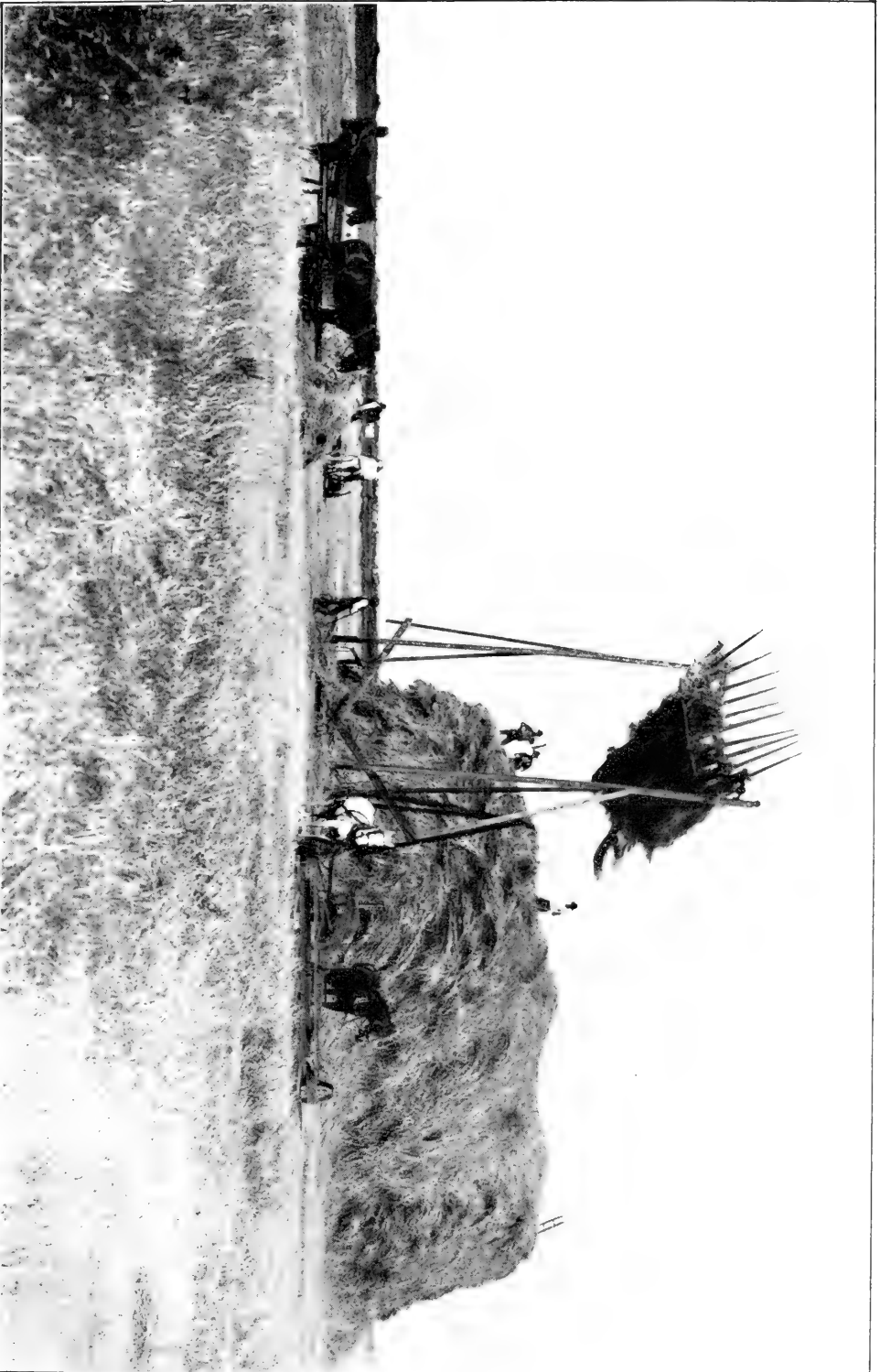
drainage all the country that it passes through, whether the district authorities like the result or not. Such a benefit to the lower region must be paid for by the people of the district. In other words, they must be assessed for benefits to lands in which they have no immediate interest.

We might illustrate a score or more of conditions of similar purport, all of which prove substantially that logically, ethically, and financially, the drainage of a swamp should comprise all the lands in a particular basin. There should be participation in the expense by every land owner, or there will be an inequitable distribution of expense. Is it not evident, then, that drainage is a big affair, to be planned and executed on a broad basis and to be financed in a way that will ensure success? Drainage is no "peanut-stand" proposition, and it is just as absurd, just as foolish, to try to divide a great swamp up into unrelated districts as it would be to divide a great trunk railway system into a collection of unrelated county or municipal units. But up to the present time our drainage work has largely been on a "peanut-stand" basis and many of the propositions for future development are conceived with no more breadth of view.

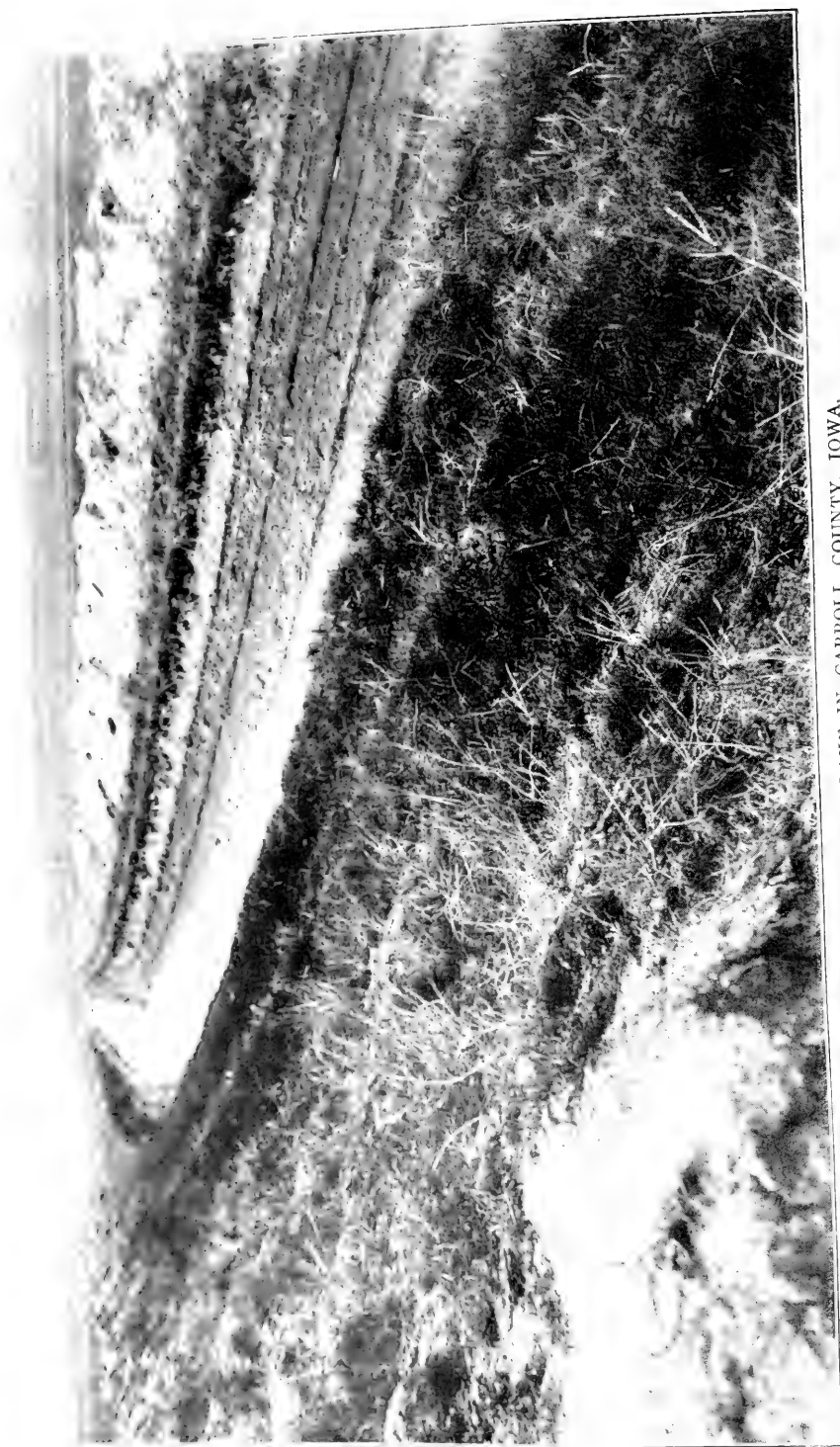
There is only one drainage project from Cape Girardeau to the Gulf; only one in the valley of the Red River of the North; one in the Tombigbee valley; one on the Apalachicola; one on the Kankakee of Indiana; and one on the Suwannee of Florida. I know that good men say that such a conception is too large and impracticable, but I am persuaded that this can not be true. It is my opinion that the problems involved in the drainage of all the swamp lands in the United States combined do not encounter the real difficulties and the untried engineering questions that are comprised in the construction of the Catskill water-supply tunnel of New York, or the installation of the new water supply of the city of Los Angeles.

THE SCOPE OF A DRAINAGE SYSTEM

I have suggested in a brief and incomplete way that which seems to me to be the necessary scope of a drainage system, and have tried to show that there are certain immutable laws of nature that must govern every drainage operation. Of course it is not intended to imply that every drainage scheme must at the outset provide for the immediate reclamation of every part of a swamp area, however great. That which is insisted upon without any reservation whatsoever is, that no drainage scheme should be carried forward without study of the entire basin within which lies the part immediately to be drained, and that every piece of work done, both interior and exterior, must be fashioned with due regard for the necessities of every other part of the basin. While it may be necessary or expedient in certain cases to drain lands by reclamation in small progressive units, the tendency should ever be toward the larger and more comprehensive work, bearing in mind that the end for which every one should strive is the inclusion of all swamp lands within any river basin. In one region at least, of which I have personal knowledge, the people, having started out on a broad and comprehensive basis, are now inclined to divide up the original area into several independent districts. That is real retrogression, and I can conceive of no greater drainage folly.



STACKING ALFALFA ON RECLAIMED SWAMPLANDS OF SACRAMENTO VALLEY, CALIFORNIA.



DITCH DRAINING GOOSE LAKE IN CARROLL COUNTY, IOWA.

In the light of the foregoing conception of drainage let us look at some of our swamps. Beginning with the most famous, the Dismal Swamp. We find that it occupies parts of Virginia and North Carolina. A little farther south, there are those areas lying on both sides of the North and South Carolina State lines. The northern part naturally drains to the southern part. The Savannah River on the northern border, and the Appalachicola on the southwestern border of Georgia, have great swamp and overflow areas in South Carolina, Alabama, and Florida. In southern Georgia, too, there are the Okefinokee swamps which, if drained, must have their outlets across the State of Florida. The Tombigbee Valley in Mississippi lies above the same valley in Alabama. The Pearl River bottoms occupy parts of Mississippi and Louisiana. The St. Francis basin lies in Missouri and Arkansas; while the swamp areas of the Red River of the North occupy Minnesota and North Dakota. Instances like this could be multiplied greatly. Wherever we look we find swamp conditions that cover land in two or more contiguous states. In other words, the greater part of our swamp drainage problems are interstate.

INTERSTATE PROBLEM OF DRAINAGE

What are state boundaries? They are lines established by man to mark off separate legal jurisdictions. They are placed where they are by virtue of conquest, discovery, agreement, or otherwise. Except when they occupy the crest of a drainage divide, they do not conform to any natural division, and natural problems and necessities are in no wise changed when state lines cross any particular basin or swamp. The natural laws governing the drainage of swamps were established long centuries before such things as state lines were conceived by man. Can it be believed that the drainage necessities in the St. Francis basin, for example, are altered in the slightest degree by the fact that the people have thrown the Arkansas-Missouri boundary across this basin? Of course such an assumption is preposterous. And yet, on the two sides of that boundary line there are separate jurisdictions, different laws and processes, and there is not even a remote probability that under present conditions there can be any unity of action on the two sides to comply with the unalterable nature requirements. Missourians, with commendable enterprise, have drained large areas of their land. The people of Arkansas must tax themselves to take care of that surplus water. When they reclaim their portion of the St. Francis basin, a part of their cost will be for the proper disposal of the water which the people of Missouri have thrown down upon them. Is it not clear that the logical and the just way to have handled the St. Francis problem would have been to drain that basin as a unit, each owner, without respect to local jurisdiction, paying his share of the whole system cost?

When we assess benefits for a city sewerage system we do not charge the owner of land located near the outlet a larger price than the one located at the head of the system, merely because the sewer in the street adjoining the lower land is larger and laid deeper than that serving the upper lands. We assess the owner at the upper end for his proportionate share of the cost

of that large outlet sewer. The principle is precisely the same in the St. Francis problem—and so it is in all other interstate swamps.

How can the matter be adjusted under two separate jurisdictions? Some one may say that the States can unite for the common purpose and to carry out the work under mutual agreement. Possibly this may be done; but we have yet to see a successful example of it. There are many who believe, as a result of observation of interstate matters, that the logical and wise way and the only surely successful one is the intervention of a common authority. And what is the established common authority as between states in this country? It is the Federal Government.

I believe most thoroughly in providing every orderly safeguard that may be necessary to preserve the integrity of local government. There can be no virtue in any proposition that would needlessly deprive any locality or any State of its prerogatives and transfer them to the nation. On the other hand, it appears to be a matter of simple logic and plain common sense that where the established requirements of an artificially divided jurisdiction in any place are inevitably opposed to the fundamental laws of nature that require common jurisdiction in that place, the requirements of the former must give way to the necessities of the latter in so far as may be necessary to accomplish the ultimate purpose. The simple fact is that we have in the drainage of interstate swamps a condition into which our much revered governmental precedents will not fit. We are confronting a new problem which requires the adjustment of our governmental ideas. It is a testimonial of our progress and an indication of our economic needs that we are so confronted, and it is inconceivable that the American people will fail to adjust themselves to any condition that forces itself upon them as a result of their enterprise and foresight.

FEDERAL CONTROL IS NECESSARY

But the national aspects of swamp reclamation are not confined to those of engineering necessities. Other aspects of economic necessity are truly Federal in fact, if not in law. Moreover, these aspects are by no means confined to interstate swamps. Seventy-four million acres of swamp land lying in almost every State in the Union constitute of themselves a sufficiently important issue to make them a matter of general welfare.

First and foremost, our swamps are the greatest single menace that now remains to public health. This Republic has from its beginning and in common with the rest of the world been subject to an enormous drain by reason of disease. Men of science have pursued these diseases, and, by hazardous labor, have brought out of obscurity fact after fact concerning them and the means of their prevention. Some diseases have not yet been run to earth but others are fully exposed, and we are reaping the benefits of the information. Swamp lands harbor the agents by which at least two destructive diseases are spread abroad. Malaria and yellow fever are transmitted by the mosquito, and in no other way. Time at my disposal does not admit of a discussion of the mosquito agency in these two diseases and it will be suffi-



SMALL CYPRESS AND GROUP OF KNEES IN ST. FRANCIS RIVER, ARKANSAS.



1712 CYPRESS IN SLOUGH, ALSO THE KNEES, UNIONTOWN, KY.



1713 DITCH, DOUGLASS SWAMP, NEAR
S...

cient to state that such an agency is an established fact. Malaria has always been a silent, but persistent scourge. Yellow fever has come repeatedly upon us, scattering terror like a horde of savages and leaving in its wake broken households, sorrowing communities, deserted markets, and financial loss. Malaria is still with us. Yellow fever will surely come again, and the pity of it is that we fail to use the means that have been placed in our hands to stamp it out forever. Is not this a Federal matter? Consider a moment. Yellow fever visited New Orleans in 1905. In the dire emergency of that time it was considered a wise and proper use of Federal authority to send national experts and Federal money there to conquer the epidemic. Would it not be wise and proper also for the Nation to prevent the evil as well? It is a wise statesman who responds to an emergency. It is a wiser one who foresees that emergency and makes ready for it.

Another national aspect of swamp drainage is that of home making. In their present condition the swamps of the country are a source of weakness in our national economy. They are now unproductive; they can be made sources of great national wealth. They are now practically vacant; they can be made to produce citizens. In other words, they can become the sustenance of the very element of which this country is made up. Seventy-four million acres of drained swamps can be made to support at least 7,000,000 people in agricultural pursuits. Is not this a national matter? Does it not enter into every element of production, trade, and finance? Does it not become an essential feature of national stability, national progress and national defense? And if all these matters are not truly Federal, why then has the Federal Government entered so largely into them in the past? The facts are that an issue so big and broad and inclusive as the reclamation of 74,000,000 acres of land must be a national matter, whether we would have it so or not.

I have not come here in advocacy of any particular measure. My whole function is to emphasize, as well as I may, the facts concerning a particular necessity. In the adjustment of State and Federal relations there is no necessary complication, no permanent relinquishment of State sovereignty is required, nor any permanent expansion of Federal authority. From a practical standpoint I can see no difficulty in securing constructive cooperation by all parties concerned. To reclaim these interstate swamps there is required a broader jurisdiction than is possessed by any one State and a more extensive credit than is possessed by any individual to whom settlement upon agricultural lands is attractive. There are many who will be opposed because the plan violates legal precedent, and many more will oppose it because of what they believe to be constitutional limitations. Whether or not there be any such limitations I am incompetent to determine, but as one who believes that government is the means and not the end, I am unable to see any insuperable obstacle. And when they who oppose rise up and cry "The Law" it appears as though the proper and comprehensive reply must be "The Necessity." In days like these one can hardly find himself justified in refusing to do a necessary thing because that thing was not foreseen by our forefathers.

SOME NOTES ON GERMAN FORESTRY

BY WARREN H. MILLER, M. F.

EDITOR OF FIELD & STREAM.

IN the summer of 1911 it was my privilege to review on a large scale forestry studies undertaken twenty years ago in Saxony, and also to compare in a general way the practical forestry of Germany with that of France, to which I recently devoted the better part of two year's study. Starting with the countless kiefer or sylvester pine forests of North Germany, continuing through the mountain fir and spruce forests of Thuringia and Saxony, and ending with the oak and beech forests on the clayey soils of Rheinland and Westphalia, I saw over two hundred German forests, many by rail and not a few by leisurely inspection, on foot. For the trained forester, such a trip was of the keenest delight, and crowded with helpful hints and practical kinks adaptable to our own practice; and a brief description of the more salient points which came under my observation may be of interest to the fraternity of foresters here in America.

Without exception these German forests were all under full management and yielding paying dividends that enabled them to hold their own against surrounding agriculture, and among the conifers only three out of about 150 forests were by natural reproduction, by seeding cuts, as in France. All the rest were planted, the experience of the German foresters being that the uniformly straight trees resulting from planting gave a market for all sizes of thinnings which would otherwise be a source of embarrassment as it now is with us.

KIEFER (SYLVESTER PINE)

Probably the most interesting study of all was the growth and disposal of the immense forests of kiefer or sylvester pine which cover Prussia. From Hamburg to Berlin, dozens of these forests are passed, and in every direction from Berlin, westward as far as Magdeburg, eastward through Prussia to Ost-Preussen, and southwards well into Saxony, they number hundreds, from small tracts of forty or fifty acres up to areas of several thousand. The natural soil is all poor and sandy, scantily mixed with loam, and will grow only potatoes and cabbages, with a little pasturage, so that forestry pays almost as well as agriculture, ranking therefore as one of the principal industries. This immense sandy plain covers a large per cent of the total area of Germany, and the country seems to have grown up with the kiefer pine as a national institution, for the influence of this tree upon the life and architecture of the people is one of the most logical instances of cause and effect to be met with in observing the fundamental characteristics of a nation. To provide a market for the six-inch kiefer thinnings there is the typical

German peasant cottage, which our architects are wont to smile at as a crude but costly manifestation of peasant architecture, and a quaint instance of waste of good lumber. If we were to set out to build such a house we would floor it with 2x10 and 2x8 hemlock joist, frame it with 2x4 (sawed out of 2x12), stucco it, and then nail on outside a $\frac{7}{8}$ " dressed imitation, "beam" of expensive white pine so that it will not warp and expose the sham. The German, on the contrary, takes his six-inch kiefer thinnings, for which we would have no other market than cord wood, squares it four-sided to a 4x4 stick dressed on one side, and frames his cottage with this otherwise worthless forest product. Who then has built the most logical house; who has wasted the less of his forest growth, and who has put the least labor on his forest product to make it commercially valuable;—the German who plants and grows straight kiefer whose thinnings only require dressing, or the American who cuts down a wild sixteen-inch hemlock to rip it up into 2x4 studs?

The three, four, and five-inch thinnings are all used for cellulose. As I passed section after section of thinned three-inch twenty-year growth and noted the neat piles of three-foot sawed and barked poles, I thought that it was thrifty of them to get off the bark for tanning, but it made rather expensive cord wood of it. But later the mystery was solved in the immense cellulose works in south Germany, principally around Dresden and Pirna where millions of feet of these same short cord-wood piles were in evidence, representing a steady market for all the three, four and five-inch trees; with even a lot of six-inch, showing over-demand. These had all been brought up the Elbe by canal boats, from the kiefer forests neighboring the course of the river until it empties into the sea at Hamburg.

Much of the eight-inch goes to Westphalia for mine timbering, though a lot of it is sawn up for door and sash trim, which is almost exclusively of this wood. Around Duisburg, in the heart of the coal and iron districts along the Rhine and the Ruhr, you will see great yards of short eight-inch lengths of kiefer for mine tunnels, and much of it is sawn into short 2x8 slabs for roofing and sheathing the mine shafts. The ten, twelve, and fourteen-inch kiefer is sawn into board lumber, beams, and timbers. The bark is all used for some purpose I could not discover in the limited time available, possibly for tan. All the rough boards are shipped just as sawn without attempting to square the edges. As nothing in Europe is wasted they probably prefer to saw the tare and sell it on the spot for kindling in preference to leaving it in the forest as waste.

In noting the silvicultural handling I was surprised at two things;—the shortness of the revolution, and the close spacing of the initial planting. I never saw a forest of kiefer set out over thirty inches to one metre apart, and they are left on this spacing until about fifteen years old. They clear themselves nicely at this spacing, and the first thinning gives you a great quantity of straight three-inch poles about 20-ft. high. It takes about two-thirds of the stand, leaving the balance on five foot centers, which are again thinned to twelve foot centers fifteen years later. The entire revolution is not over sixty years, by which time the entire stand is of dominant twelve-inch and second-stage ten-inch trees, with here and there a more successful

one of fourteen inches. The taper is very slight, the twelve-inch diameter continuing up to about 25 ft. or well up onto the reddish part of the trunk, after which it suddenly tumbles in and branches to the crown limbs. Total height about forty feet, of which all but about twelve feet of crown is saw lumber. The branches of the crown, down to about an inch, are sold for firewood, and, if no faggot-gatherers are at hand, the rest is piled in rectangular piles, some six by ten feet by seventy feet high. I did not see any being burnt. They could easily shovel in sand layers in the pile and allow the whole to reduce itself to compost for planting operations. I did not have the opportunity to examine the interior of a pile, and, as it was not the planting season, nothing was being done with them.

METHOD OF PLANTING KIEFER

One of the objects of my tour was to see whether the method of planting of Baron Manteuffel, extensively used in Saxony during his administration as chief forester, had extended itself to Prussia and Hesse, or was being still used in Saxony. It consists essentially in surrounding the roots of each small plant with a little hill of compost, and covering this with a cone of sod, made of two crescents of turf lapping to a cone with the grass side in. It is a splendid, if costly method, as it surrounds the roots of the young plant with the nutritious vapors from the compost and the sod, engendered by the heat of the sun upon the outside of the cone. It was highly successful with spruce during the Baron's time, as it not only raised the young tree above the surrounding vegetation, but also kept it free from sogginess and cold.

However, I saw no kiefer planted that way. The invariable method was to plant in holes, with the root collet level with the prevailing soil, and compost around the roots. I saw no trees planted under three years old, and this seems a good thing when we reflect how subject to fungus diseases, such as *roussi*, pine is during its early years in the nursery. It is well to have it where it can be watched and guarded during the earliest years, and doubtless the expense of another year in the nursery more than offsets the extra cost of the Manteuffel method of planting for young plants which would otherwise be advisable in the field.

The majority of the cuttings were in long strips, a mile or so long by, say, four hundred feet wide; though one occasionally met square or irregular sections. As a rule the stumps were pulled and sold before replanting, though now and then you saw a section with the young trees missing, the stumps of the former stand. Virtually the only pine forest I saw with natural reproduction was a big tract of eight or nine hundred acres near Mannheim, which forest appeared to be all natural reproduction. Its newly regenerated sections contained a thick furr of young pines, with seed trees on about 200 feet centers still standing, but the trees on the 20 and 30-year stands were not nearly so straight as with the planted sections of the majority of the German kiefer forests.

The physical characteristics of kiefer are much the same as the sylvester pine of France. It will reach 70 to 80 feet high and 18 to 20 inches diameter if allowed an 80 year revolution; all the upper third of it has a sort of reddish-

orange ragged bark, giving it its American name of Red Pine; it has two needles only to the sheaf,—I never saw a sheath of three needles, though I believe this is so of sylvester pine elsewhere. The lower bark is rugged, gray, with reddish edges. If shaved down to allow a ring of tar, such as is seen in whole forests of it where an insect epidemic is feared, the inner bark is the same reddish-orange as the bark further up. Like all sandy-soil species, it has an immense spread of shallow roots. The seeding cut, if natural reproduction, is very clear, seeders on 150 feet to 200-foot centers.

FIRE PROTECTION

All through East Prussia the railroad fire protection appears to be uniform and required by law wherever a forest abuts on a railroad. The right of way extends some 25 feet beyond the outer rails. Along its edge extends a shallow four-foot road of clean sand, sunken six inches below the soil level, and a similar road runs parallel to it thirty feet further back. These two trenches are joined by three-foot cross paths every ninety feet, forming rectangles along the railroad which are either kept entirely bare, only grass being allowed to grow, or else planted with white birch or locust, forming a tall border of hardwoods in which a falling cinder can do no harm. The forest abuts on the second path or road, while a third similar one with cross trenches can be discerned running along parallel inside the forest as a second line of defense, though this third trench is not universal. The arrangement is however obligatory, the only variation being in what kind of tree is planted in the protective rectangles. Occasionally they are used for vegetables or nursery beds, but the general favorite is locust. I tried to photograph some of these fire borders from the car window, but the negatives resulted in a blur, with shutter at 1/100 second.

Crossing over into Saxony, this protective border is replaced by an absolutely bare strip, 100 feet wide, running along the right of way, usually with its forest edge having a wagon road fifteen feet wide running along it and connecting with all the fire and logging lanes. In Hesse and Westphalia still another fire regulation is in force, there being twenty feet of clear grass along the right of way, next a 25-foot strip of birch or locust and finally a 12-foot road forming the edge of the forest. In all these types of fire borders the law was rigidly enforced of cleaning the younger trees and young sections of all lower limbs up to six feet from the ground, except in the case of very young sections, of course.

The fire lanes were spaced from 250 to 400 feet apart, of a width approximately the height of the trees in the section. In young plantations the ten-foot fire lane is quite common and thirty feet is usual with mature stands of kiefer and spruce in Saxony. Along the railroad these lanes are perpendicular to the road or nearly so, depending upon the lines of planting, to which they are always parallel. On hillsides they run up and down hill, notably in the big forests of 25-year spruce near Fulda, with 10-foot fire lanes every 250 feet.

SPRUCE AND FIR

Going from Prussia into Saxony, the character of the soil changes and

with it the forests. The kiefer becomes less frequent as more fertile and mountainous soils are encountered, and big spruce and fir stands with some hardwood become frequent. Near Breda, between Berlin and Dresden, I encountered the first stand of oak growing under sylvester pine, evidently the same method of reclamation of the heather (*Calluna Vulgaris*) moors into hardwood stands as in France. A little farther on, two miles from the town of Elm, is an interesting forest of fir, bordered with larch. This larch border, both for spruce and fir, I was to encounter very frequently thereafter. There is a considerable market for larch in Germany, and as it is a hardy, intolerant mountain tree over there, the best way to grow it is as a wide forty-foot border around a spruce or fir stand. The fresh yearly growths, yellow-green in September, of the twig-ends of European larch are catkins of needles five to seven inches long (the catkins, not the needles) which later divide up into the characteristic little tassels of ten or twelve needles sessile on the twig.

At Dresden I again revisited the forests of the Dresdener Haide and the Neiderwald in the Saxon Switzerland. Much young spruce is now being grown on kiefer soil in the Haide and seems to be coming along admirably. In the mountains both spruce and fir, properly thinned on selection forest methods, were reaching 16 inches diameter on 65-years growth, and were being logged on 70 and 80 year revolutions,—an encouraging advance over the usual 100-year revolution, and due entirely to judicious thinning. All regeneration was by planting, usually on the hole system, as I saw but one forest on the hillock system of Baron Manteuffel. The larch border is here a good deal in evidence. The photographs hereto of the forest operations in the mountains will give one a better idea of spruce and fir culture than any words of mine. In general, standard forest on slopes up to 45°; steeper than this, selection forest.

Leaving the Dresden district our route lay through Thuringia and into Hesse. After Leipsic this entire country becomes mountainous with spruce predominating,—the spruce which has made the Saxon foresters famous. The hills and plains were covered with it, always with the bare 100-foot strip along the railroad right of way characteristic of the Saxon fire protection regulations. The spacing at planting was almost as narrow as kiefer,—from one metre to four feet setting out, and left so up to fifteen years, by which time the lower reaches of the forest would be black with suppressed branches. As with young kiefer, all the eight to fifteen-year growth was trimmed up to six feet from the ground of its dead cleaning branches for at least the first section back from the railroad. I saw no young spruce set out under three years old, and the forests held sections of every conceivable age up to the end of the revolution, which was about 70 years. All the first thinning spruce finds its way to the wood pulp industries, in which this part of Germany abounds, being in a measure the chemical center of Germany. The four-inch stuff of the 25-year thinnings is used in a large measure for scaffolding poles in building construction, the poles being lashed with rope and taken down after the mason work, stucco, etc., is finished on the building. This method of scaffolding is also becoming quite common with our own contractors,



HERTOGENWALD IN BELGIUM. THE FOREST RESTORED.
SPRUCE WOODS ARE BETTER THAN WASTE.



BEECH WOODS IN BELGIUM.

replacing in a large measure the old expensive style of using hemlock stud-ding. It is universal in building construction in Germany. A large quantity of this small spruce goes for the masts and spars of the extensive inland water-way commerce of the Fatherland, as every old canal boat and lugger owns a collapsible mast of some kind, besides a full complement of poling spars. All the larger thinnings go for ship and derrick masts, trim, boards, beams and the like. The boards are shipped untrimmed, the log being peeled in the forest and sawn forthwith into planks which are shipped direct to the cities in canal boats without any edge trimming. One sees in Berlin, Frankfort, and the big industrial cities along the lower Rhine any quantity of such boards being unloaded from the canal boats. The planing mill has use for all their trimmings for kindling, etc., and the city can absorb such forest waste at a far greater profit than if trimmed before shipment.

THE HARDWOOD DISTRICTS

Approaching Frankfort, the clayey nature of the Rhinish soils begins to be manifest in hardwood stands, beginning with the big stand of pure oak with some spruce sections near Hanau. From here on mixed forests become the rule; not mixtures, but forests in which there will be a number of sections of oak, then spruce, then fir, then beech, etc. The hardwood regeneration is almost entirely by seeding cut, as in France,—I have no note of a single planted beech forest and only one of oak. The stands are uniform and the young sections thickly furred. There is of course not the necessity nor the natural inclination towards absolutely straight trees as with the conifers.

In the lower Rhine districts where marl and clays form the soil, the hardwood forests are very numerous, almost always with planted spruce sections included. The higher spots in Westphalia, however, are left in kiefer almost exclusively, probably from the scarcity of water as the soil is a good loam capable of growing oak. Between Cologne and Dusseldorf I noted a hardwood forest with a broad larch border of full-grown trees, showing that that method of raising larch is at least eighty years in use. I never read any great mention of it in German forest text books.

Near Duisburg is a characteristic mixed forest which I had the pleasure of examining on foot. First came a young oak stand of about thirty-five year trees, all natural regeneration and all somewhat crooked. Next a number of sections of hornbeam (characteristic of the north of France, not far from here); and then there was considerable high ground devoted to a dozen sections of kiefer, all planted. The soil was a rich sandy loam and the underlying strata of clay in the lower parts doubtless made the selection of oak and hornbeam logical.

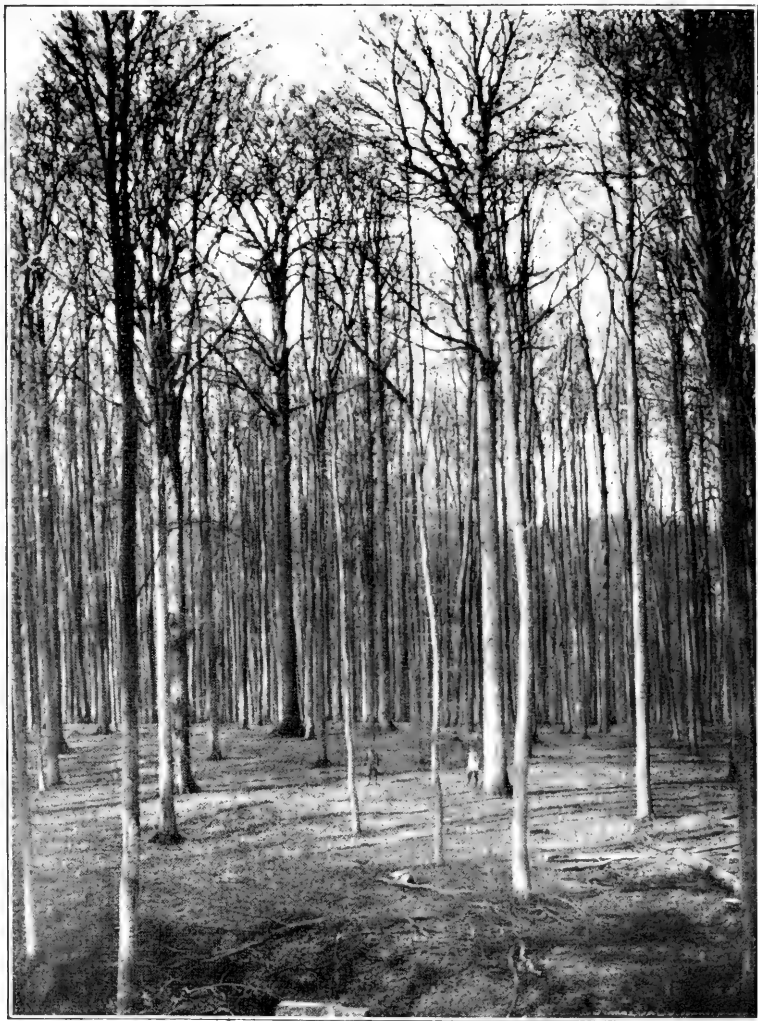
About three kilometers beyond Duisburg is another of these mixed forests. First is about 200 acres of pure beech, a thirty-year stand; then beech mixed with larch, the latter doing well in spite of having such a poor neighbor as beech; then oak and spruce, the spruce being very poor, and finally forty acres of kiefer on sandy soil. A locust border and the forest logging lanes protected this forest where the railroad ran through it.

The further one gets towards Belgium the more clayey and richer the soil. Near Aix-la-Chapelle, about fifteen miles west of Cologne, is a fine stand of mature pure beech, then a small stand of spruce, and finally oak, all doing well on a clayey-sand soil, the spruce being planted. A short distance further on one passes a big planted spruce forest of 25-year trees abutting for half a mile on the railroad with ten and twenty-foot fire lanes perpendicular to the track every three-hundred feet. A bare open strip one hundred feet wide, protected this forest from the locomotive fires. Speaking of fire protection, I would like to note here that though this was near the end of one of the most severe drouths Germany has known, no rain having fallen for over nine weeks, I did not see a single forest fire except one down in the Bohemian Switzerland, beyond the Saxon border, where a big one was rolling acres of smoke up over the mountains near Tetschen-Bodenbach. But in all Germany, though one could see for twenty miles each side of the track, not a forest fire was in evidence. There was plenty of grass burns in the protective strips, but the lanes and trenches seemed to have automatically stopped them from getting into the forests.

IN BELGIUM

Just outside of Aix-la-Chapelle there are large spruce and oak forests, and shortly beyond you cross the border at Veviers into Belgium and practical forestry ends as suddenly as if one were transported to America. The usual wild neglected forest, so familiar along the right of way at home began to appear. Trees of all sizes and shapes and species rambled along together, mostly crooked and worthless commercially, and giving no sort of yield sylviculturally. About fifteen thousand feet to the acre would be about the value of the cutting, whereas the German forests I had just passed would run nearer sixty thousand, and ninety thousand is not at all uncommon.

During the whole of seven hundred miles of travel in Germany, never did I see a single tract of woodland neglected or one that was allowed to exist without yielding up a revenue up to the full bearing power of the soil. I saw hundreds of examples of German forestry, with practically all the species represented except maritime pine;—the kiefer of the great sandy plains of Prussia, the spruce and fir of Saxony, and the hardwoods of the Rhine, but never a single acre of wasted forest land. And the fact that much of it was on the railroad, with each its siding for swift and cheap transportation spoke well for a quick and profitable market, with but little expense intervening between the ripe tree and the lumber mill. It was easy to realize how Germany, with a total forest area of only thirty-five million acres, gets an annual yield of four-and-a-half billion board feet, and no less remarkable, to my mind, is the adaption of house building practice and of the industries of Germany to the needs of its forestry so that nothing is wasted. It would seem that, in the course of centuries of tree crops, the foresters and the architects had gotten together to agree on the best way to use *all* the wood that is grown on the soil.



BELGIUM, THE DENSEST POPULATED COUNTRY IN EUROPE,
CAN AFFORD WOODS.

FORÊT DE SOIDNES.



LEARNING OF WINDELLS AND COLLECTING FIGURES FOR GROWTH STUDY BY STUDENTS OF THE UNIVERSITY OF MAINE.

DEPARTMENT OF FORESTRY, UNIVERSITY OF MAINE

By JOHN M. BRISCOE.

THE Department of Forestry at the University of Maine was established in 1903 and is the oldest undergraduate school of forestry in continuous existence in the United States. In the State of Maine, where the lumber and pulp interests are so great, the need of such a department was early recognized. The object of the department is to promote forestry throughout the State, and to provide a body of men suitably trained for the intelligent handling of forests, and also to serve as a preparatory school for those who intend to make forestry their profession.

Besides extension work and the general propagation of information on forestry subjects throughout the State the department strives to reach two classes of students:

1. Agricultural students who must have some knowledge of forestry for the conservative handling of their wood lots; and
2. Students who intend to make forestry their profession.

For the first a 36-hour course of lectures on general forestry is given in the spring semester each year. This course is required of agricultural students and it may be supplemented by electing any other forestry course for which the student has had sufficient preparation.

For the second a complete curriculum for the entire four years has been arranged and is required of all students majoring in forestry.

THE EQUIPMENT

The forest is the largest and best laboratory. The main office, class rooms, drawing rooms, and other laboratories are located in Winslow Hall, the largest and most modern building on the campus. The ground plan of this building measures 63 feet by 100 feet, and it contains over 40 rooms. It is built of brick, concrete and slate, of Tudor style of architecture, and has four floors including a well lighted basement in which the department has a large wood storage room and lockers. On the second floor are the offices and lecture rooms of the department. The third floor is occupied by a large lecture room and two drawing rooms separated from the larger room by folding doors, so that the three rooms can be thrown into a large auditorium at any time.

The interior finish and furniture are in a dark stain, and the building is equipped with electric light, elevator, hot and cold water, gas, and high pressure steam for laboratory work. Besides the laboratories and lecture rooms, in the basement there is a dark room for photographic work as well as lavatories and shower baths.

The department has a large electrical stereopticon and reflectroscope which is frequently used to illustrate the lectures, and there is a large supply of lantern slides and photographs illustrating every phase of forestry work. The equipment of forestry instruments of both American and German make is very complete. Most of this equipment is entirely new, and all is of the best quality obtainable. It is provided and added to yearly by the State as the necessity arises.

A forest nursery has been started in connected with the department, and young forest trees are grown for the purpose of experimental planting.

THE CURRICULUM

A complete undergraduate curriculum is arranged which will serve as the basis not only of practical work in forestry, but also of a liberal education. During the first two years much attention is given to biology and civil engineering, both of which are very important fundamentals upon which are built the more technical forestry courses. A knowledge of the principles of forestry in its different branches is given to the student, and considerable practical work is done in the forest. The woodlands belonging to the university, together with adjacent lands covered by young forest, furnish a field for the study of many forest problems. Field trips are made and demonstration thinnings and plantations made at various places throughout the State. Particular attention is given to the collection and presentation of statistical data in report form.

Detailed descriptions of the courses as well as of scholarships and prizes offered by the university may be found in a special catalog of the Forestry Department which will be mailed to any one upon request.

The instruction in this department consists of lectures, recitations, laboratory and field work, the latter consuming a considerable portion of the scheduled time during the Junior and Senior years. The instruction in technical forestry subjects is given by the professor in charge of the department, and a field assistant. This is supplemented by work given in other departments under fifteen different professors and their assistants. Five recitations hours a week of successful work for one semester entitle a student to one credit. The minimum is seventeen hours a week (exclusive of physical training and military science), leading to three and two-fifths credits. A total of thirty credits or 150 semester hours is required for graduation. At graduation the student receives the degree of Bachelor of Science in Forestry.

Students who complete the curriculum are admitted to advanced standing in the graduate schools of forestry and are thus able to shorten the time required to obtain a Master's degree. Graduates are, however, prepared to go directly into practical work, and up to the present time there has been no difficulty in placing them in permanent positions.

There are good openings for students to obtain work in the maine woods during the summer vacations, and many take advantage of the opportunity to get practical experience, and at the same time aid in defraying the expense of their university course.

There are now 44 students majoring in forestry, beside some 50 others

taking one or more courses in the Forestry Department. Graduates of the school are in the employ of the United States Forest Service, and in charge of important State and private forestry work. Some of these are already employing students during the summer vacation and assisting them in securing permanent positions after graduation.

OBJECT OF THE CURRICULUM

The object is to give the student the best possible preparation for his future work, either in actual forest management or in the further pursuit of the subject at one of the graduate schools of forestry.

The forestry curriculum is not an easy one, and is suitable only for students who have good health and a strong constitution and are moreover able and willing to stand considerable physical as well as mental exertion. It is meant to prepare men for the requirements of the actual work that they will have to do after they have completed their college education, and it is by no means a sanitarium for those who simply desire to lead an outdoor life.

Owing to the fact that the timber was stripped from the mountains in its vicinity in so reckless a manner that there is now nothing but a spare second growth, a large powder plant of the Dupont Company at Wapwallopen, Pennsylvania, will be abandoned January 1st, the stripping the timber from the mountains having decreased the water supply so greatly that it is of no further practical service.

Mr. Albert Lewis, one of the lumber kings of the northeastern section of Pennsylvania, has spent over \$100,000 in building beautiful roads through his large lumber tracts in the vicinity of Bear Creek, Pennsylvania.

Title to about 5,000,000 feet of hemlock and hardwood in the vicinity of Warren, Pennsylvania, has been secured by the Poverty Lumber Company, and in addition is included enough timber to make about 5,000 ties. The timber tract embraces three hundred acres and is located at Brown Run.

Mr. S. T. Starrett, of California, has been appointed to fill the new office of Marketing Superintendent for the Hawaiian Territory. Mr. Starrett has made a preliminary trip over a considerable portion of the territory and in his report has made a number of valuable suggestions.

The experiment station at Wagon Wheel Gap, Colorado, established for the purpose of making an exhaustive study of the effect of forests upon climate and streamflow, is now upon a firm basis and a series of experiments has been made during the last eight months.

"It is generally thought that timber is fast disappearing from the hills and valleys of West Virginia, and in a sense this is true; but there is still plenty of timber in the state," says Charles L. McSuade, of Greenbrier County, West Virginia. "West Virginia now has laws protecting timber and if the laws are enforced it will be many years before the lands are shorn of their valuable forests."

THE PRAIRIE DOG MUST GO

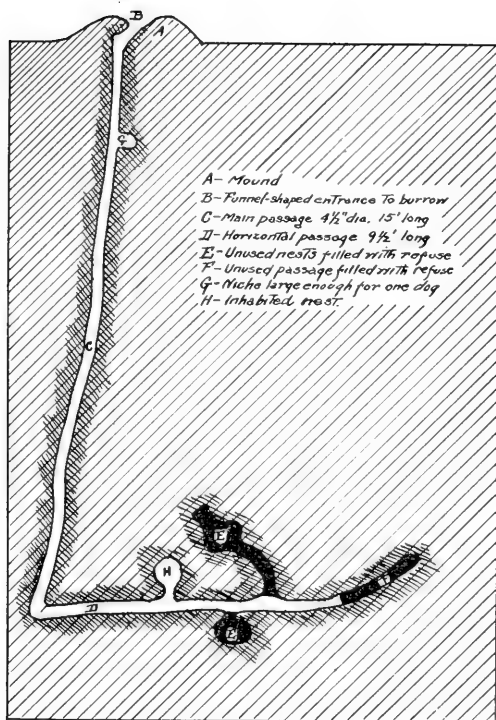
By ROBERT E. CLARK,

DEPUTY SUPERVISOR, LEADVILLE NATIONAL FOREST.

To make the earth habitable for himself, man, throughout history, has been compelled to wage war on other animals whose existence has run counter to his interests. Always he has killed off or driven out the beasts that have interfered with him or his property. The rattlesnake and the wolf are now unknown in many parts of the country, though the typhoid fly and the familiar but consuming mouse still abound. From the saber-tooth tiger of primitive times to the plague-infested rat or the destructive San Jose scale, the fight has gone on. Had the killing been confined to such as these, the record would be better, for man has exterminated many kinds of animals which are not only harmless but useful. Just now he is after a most interesting little animal, but one that is doing immeasurable harm throughout the cattle and sheep ranges of the West.

Since prairie dog and white man were first introduced to one another, each has doubtless considered the other an undesirable citizen. With the entrance of the pioneers came the loss of horses and cattle through broken legs as the result of stepping into prairie dog holes. Also man himself often suffered broken bones as a result of being thrown from a horse which had the misfortune to step into a dog burrow. Then came the stock-raising industry, and the sufferings and losses experienced by this industry has made it evident that an infestation of prairie dogs on any portion of the range is a decided hindrance to perfect handling of stock.

Not only do the owners suffer direct loss from the necessity of shooting stock that have broken limbs, but yearly they suffer a considerable loss due to cattle being light in weight. Cattle fall off in weight either from lack of feed or from being required to move about considerably to find the feed. Every prairie dog hole or town on the range causes a considerable area to become bare of grass or other forage, and it is but a few years after the dogs come in before large tracts are worthless to stock. The feeding capacity of the range is reduced not only by the area included in the dog towns, but also for a considerable distance surrounding these tracts, for their feeding grounds must be included in the range that the dogs destroy. Like other rodents, they have increased with the advent of man. The rapid increase in their number has become so pronounced that steps have been taken by the Biological Survey of the Department of Agriculture, by the Forest Service, and by private individuals to accomplish their extermination.



PLAN OF THE BURROW OF A PRAIRIE DOG.



SCATTERING THE POISON FOR PRAIRIE DOGS ON A BADLY DEVASTATED AREA, WHERE ALL THE FORAGE HAS BEEN DESTROYED.



SON TO POISON GRAIN FOR EXTERMINATION OF PRAIRIE DOGS.



THE POISONED GRAIN

These animals are gregarious and, through a dislike of solitude or a desire for protection, live in "prairie dog towns." These towns look not unlike a group of miniature volcanoes, of which the mouth of each burrow closely resembles the crater. The mound of closely packed earth serves two purposes; it prevents water from running into the burrow, and at the same time furnishes a lookout station for the occupant. As one approaches a town one will observe, while still some distance away, a number of little upright figures, erect and motionless as statues, on top of several of these little mounds. Upon close approach these figures emit a series of sharp cries and, with a flip of their tails, disappear like a flash. These are the sentinel dogs stationed on the outskirts of the town. As soon as the warning is given, there follows a rapid scurrying of the other inhabitants and a like disappearance into the ground. One marvels at the quickness of the whole performance. When a number of these sentinel dogs are in such a position as to be silhouetted against the sky, their upright position, warning cry, and rapid disappearance remind one of the stationary animal target, the shot, and the drop of the target familiar in shooting galleries.

THE HABITS OF THE DOGS

The prairie dog is herbivorous and roams about at a short distance from the burrow, feeding on grass blades and stems. Their drinking water is sought by some people to be obtained from their burrows, or, in other words, the theory has been repeatedly advanced that these little fellows burrow down to water. This is incredible; Dr. C. Hart Merriam points out that in some regions where these animals live the nearest veins of water are 1,000 feet below the surface. Presumably they can live without drinking, or at least with no more water than is afforded by the vegetation itself, or by the dews upon it.

Little is commonly known about the underground plans of their burrows, since it is almost impossible to unearth them without damage. This has been done, however, notably by Mr. W. H. Osgood of the Biological Survey, and the diagrammatic illustration gives a good idea of the construction. The mound at the entrance is conical in shape, and almost invariably compact in its formation. As the construction of a new burrow advances, the fresh earth which is excavated is gradually shaped and packed into this hard conical mass by the builders, using their noses as tamping bars and shovels. Packed as it is, it resists erosion by rain and wind. The burrows may be as much as 15 feet deep, though the average depth is nearer 8 or 10 feet.

The indications are that prairie dogs have but one litter in a season, with from three to eight young born at a time. This accounts for the spreading out of their towns, as new families set up for themselves.

They are extremely interesting little animals and very "cute," even to those who are familiar with the harm they do. It is true, too, that their little "chirp-chirp" lessens the monotony of the prairie to the lone traveler, but these redeeming points are not sufficient to make a balance in their favor, or to prevent urgent efforts for their extermination.

METHODS OF EXTERMINATION

The United States Biological Survey has for several years past tried various methods of exterminating the prairie dog. It has decided that the most effective and economical methods to employ are poisoning with barley roots soaked in strychnine, and suffocating through the introduction of bisulphide of carbon into the burrows. About one-half teaspoonful of the poisoned bait scattered on the hard ground at the mouth of a burrow is sufficient. When the bisulphide of carbon is used it is placed upon some absorptive material and thrust as far into the burrow as possible and then the entrance of the burrow is closed. If the bulk of the animals are destroyed by poisoning with strychnine in spring or winter when food is scarce, and the remaining animals subsequently treated with bisulphide of carbon, whole towns can be destroyed at a cost of not more than 16 or 17 cents per acre, probably less. Other baits that may be used are green alfalfa, green stems of young wheat or barley, and green corn stalks.

Besides the extensive efforts of the Biological Survey, the prairie dogs are fought by the Forest Service. Large areas of natural cattle range are within National Forests, and every effort is being made to put these ranges in perfect condition; hence efforts are made to get rid of both prairie dogs and predatory animals. Some persons believe that the decrease in the number of wolves and coyotes has caused an increase in the number of prairie dogs, a nice balance of nature having been destroyed. It is true that the most inveterate enemies of the prairie dog are the wolf, the coyote, the badger, and the rattlesnake. This list would make one want to take the side of the prairie dog if one could choose between him and his enemies. But the prairie dog is always the eaten, never the eater.

Not much has been done as yet; there is not money enough to pay for the material and labor required. However, the work of locating the towns is complete, and this is one of the most important steps in the work. Such work as the Forest Service has been able to do has been slow but sure. The poisoned grain method has been used almost invariably.

Following is the formula perfected and recommended by the Biological Survey:

STARCH-STRYCHNINE FORMULA FOR COATING GRAIN

Barley, clean grain, free from other seeds.....	20 quarts
Strychnia sulphate (ground or powdered).....	1 ounce
Saccharine	1 teaspoonful
Gloss starch (ordinary laundry starch).....	1½ teaspoonful
Water	1½ pints

Dissolve the starch in a little cold water and add 1½ pints of boiling water, making a rather thick solution. While hot, stir in the strychnine and mix until free from lumps; then add the saccharine and beat thoroughly. Now pour the poisoned starch over the barley and stir rapidly until the poison is evenly distributed; then allow the grain to dry. When dry it will keep indefinitely without deterioration.

For ordinary quantities a galvanized-iron washtub is an excellent re-

ceptacle in which to mix the grain with the poisoned starch; but when large quantities are needed the mixing may be done in a water trough with a shovel and hoe.

DISTRIBUTING THE POISONED GRAIN

In distributing the grain each man has a sack slung over his shoulder and walks across country, covering a strip about 75 feet wide, and putting about $\frac{1}{2}$ teaspoonful of the grain at each hole. The bait is placed about 18 inches from the mouth of the burrow, as experience has shown that if the grain be placed in or down the hole it is either trampled underfoot or thrown out. At times it can be distributed from the back of a horse, but where the holes are close together this method has proved to be unsatisfactory. The distribution takes place just as early in the spring as weather conditions will permit. The dogs are then hungry and will eat almost anything. As soon as the green grass comes, they are not so likely to eat the bait. Clear weather is desirable, as repeated rains or snows will tend to leach out the poison. One bushel of grain makes approximately 4,000 baits, and one man can easily distribute 6,000 baits, or $1\frac{1}{2}$ bushels, a day.

After the poisoning, one does not see all the dead dogs about, and at first the work is likely to be thought a comparative failure. This is not the case, however, for in some instances the dogs back into their burrows and die underground. Examination of the treated areas also proves that few, if any, birds are killed by the poison. Sometimes coyotes and foxes have devoured the carcasses. This results in an indirect poisoning, but that is no great loss. Shooting prairie dogs has never resulted in any marked success, as one can not approach within reasonable shooting distance, and since they usually fall back into their holes when shot one can not be sure of the success of his aim. Drowning out has been tried, but it is too slow a process.

Though the work is slow, continued operations will tell in time. The Forest Service has treated only areas within the National Forests. Now, however, the Biological Survey is to take up the work both within and without the Forests. Cooperation with stockraisers is the next step, and the people who use the range see the importance of the work and are aiding it as much as possible.

Manufacturers, foresters, scientists and timber holders will be interested in the announcement that the St. Louis Lumberman has just issued in pamphlet form two important papers on the Utilization of Wood Waste by Walter B. Harper, M.S., and Prof. G. B. Frankforter, of the School of Chemistry of the University of Minnesota.

A description of the chestnut blight with blanks to be filled in giving information as to the presence or absence of the disease has been sent to all parts of the state by the New York State Conservation Department. In this way a very satisfactory and helpful location map has been prepared.

The School of Forestry of Washington has added a course in logging engineering this year. It is practically planned to meet the needs of men preparing for careers as lumbermen.

IRRIGATION IN TURKESTAN

BY A. P. DAVIS,

CHIEF ENGINEER, UNITED STATES RECLAMATION SERVICE.

WESTERN Turkestan is a portion of the Russian Empire and comprises the southwestern part of Asiatic Russia. Within its limits are the provinces of Sir Daria, Ferghana, Samarkand and Trans Caspia. These are Russian provinces entirely under the jurisdiction of the Empire. They have a total area of 1,680,000 square miles, and a population of about 9,000,000. The same general area also includes the provinces of Khiva and Bokhara, which are nominally independent principalities, but are under the protection of Russia.

Nearly all of the drainage of Turkestan is into the Aral Sea, a body of water about 200 miles long and 150 miles wide. It is only about 60 feet above sea level. The eastern and southern portions of Turkestan are traversed by lofty mountain ranges, upon which the precipitation is very great, and is mostly in the form of snow. These mountains are drained by numerous streams, most of which lose their waters in the great sandy deserts of Central Turkestan, but the largest two of which reach the Aral Sea.

Most of the streams are used more or less for irrigation, the total irrigated area in Turkestan being nearly 6,000,000 acres, of which over one-third or 2,000,000 acres is in Ferghana Province, and 3,000,000 are irrigated in Samarkand and Sir Daria Provinces, and the rest scattered through the other provinces.

Russian Turkestan is a region of very great historic interest. It abounds in ruins of buildings, forts and irrigation systems, some of them prehistoric. The celebrated expedition of Alexander the Great, penetrated Turkestan as far as Khoghent, and ruins of fortresses built by his men may still be seen.

At a later date, the country was conquered by the renowned Jenghiz Kahn, whose descendants reigned over Turkestan for several centuries. One of them, Tamerlane, made his capital at the city of Samarkand, and built there magnificent palaces and temples of substantial character and great architectural beauty richly decorated with mosaic. The usual native architecture is of adobe, like that of New Mexico.

Turkestan was conquered and reconquered so many times and so many efforts to colonize it have been made, that its population is a complicated mixture of Europeans, Mongols, Persian, Turkomen and various other peoples. Agricultural and pastoral pursuits are their chief occupations, and their state of civilization is similar to that of Mexico and Central America. Plowing

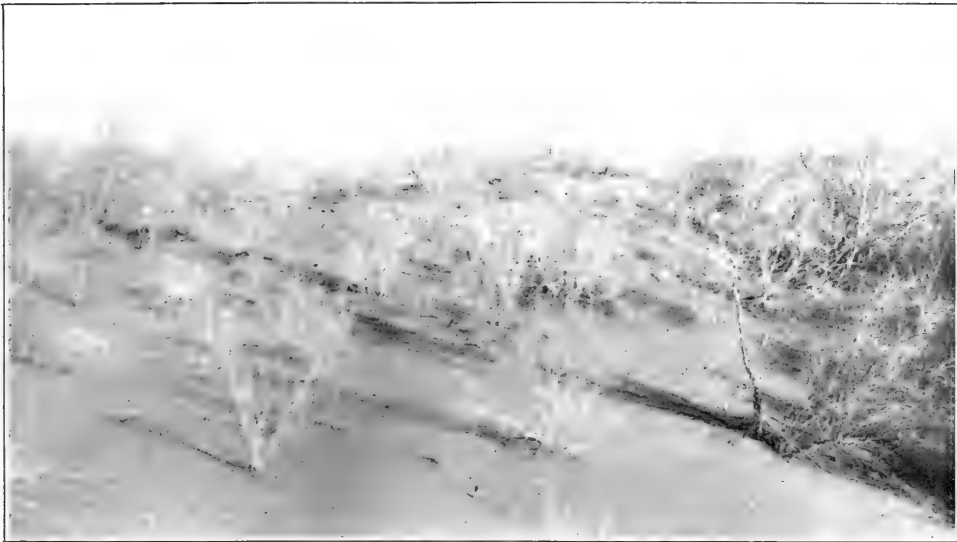


Photo by A. P. Davis.

BRUSH PLANTED NEAR FAROB, TURKESTAN, TO PREVENT SAND DUNES FROM
DRIFTING ONTO RAILROAD.



Photo by A. P. Davis.

PACKING CAMELS AT BYRAMALI.



Photo by A. P. Davis.
VILLAGE OF GOLODNIA STEPPE, TURKESTAN.



Photo by A. P. Davis.
NURSERY OF DESERT PLANTS FOR TRANSPLANTING TO SAND DUNES TO KEEP
THEM FROM DRIETING OVER RAILROAD.

is done with a forked stick shod with iron, drawn by oxen or horses. Camels are extensively used as beasts of burden, and the donkey is also much in evidence.

The climate is of the most pronounced continental type, very cold in winter and hot in summer. The precipitation in the valley regions is from 5 to 10 inches per annum, but in the lofty mountains is very great, and is mostly in the form of snow.

The largest river in Turkestan is the Amou Daria or Oxus, which rises in the high mountains of the Hindu-Kush and Kuen Lun. It is nearly 2,000 miles in length, 800 miles of which are the valley portions of the main stream from the junction of the Panj and Vach, its principal tributaries, to the Aral Sea. Innumerable small diversions for irrigation are made from this stream and its tributaries in the rude way characteristic of primitive peoples. There is still a very large unappropriated flow of water, but the small declivity of the river and the undesirable character of the land outside of its immediate valley have so far not attracted the investment of capital.

The valley of the Amou Daria for a width of over 60 miles is occupied mainly by sand dunes almost bare of vegetation and constantly shifting under the action of the wind which prevails from April to September, inclusive. In the winter months it blows more from other directions. It is said that twelve years ago trains passing through this region averaged less than two miles per hour on account of sand obstruction, and had to carry a crew of laborers to shovel sand off the track. During the last twelve years efforts have been made to cover a zone along the track with vegetation to break the force of the wind and hold the sand in place. An Experiment Station was established at Farob and in 1898 the propagation of native plants was begun. Seeds of the native desert shrubbery were planted in a nursery, where the sand was covered with brush and staked down to keep it from blowing away. The young shrubs were transplanted from the nursery to a zone one thousand feet wide on the west side of the railroad track and five hundred feet on the east side. About 15 to 20 per cent of the plants grew and spread by natural seeding. The vegetated area is now more than one thousand feet wide on each side of the track for a part of the distance, and great benefit has resulted. The work is still in progress.

The plant most successful for first use is *Alhalla Kamolorum*, which grows most easily and abundantly. After a good stand of this is obtained *Salsola* is introduced, which grows first as a parasite on others and finally crowds them out, growing larger and being thus more effective.

The most important and best constructed irrigation system in Turkestan is on the Estate of the Czar, on the Murgab River, with headquarters at the historic town of Byram Ali.

The first recorded irrigation construction in the Murgab Valley was under the authority of the Sultan Sanjar in the Twelfth Century, who built a dam about 60 miles above Byram Ali and irrigated over 50,000 acres. The location was at the very head of the Valley, where the sand dunes begin to encroach upon the river.

This ancient canal system was destroyed by Ghengis Kahn and the valley was consequently depopulated. It was rebuilt by a grandson of Tamerlane in the Fifteenth Century.

In 1799 the system as rebuilt was destroyed by the Emir of Bokhara, and the valley was again depopulated and reverted to desert.

After the conquest of Turkestan by the Russian Government, the valley was added to the Emperor's Estate and in the years 1887, 1888 and 1889, the dam at Sultan Bend was rebuilt for the Emperor by the engineer Kosel-Poklevsky, a Polish revolutionist, who had been banished to Siberia, served his term and came to Byram Ali. He made brick and hydraulic lime on the ground, of which he built the dam, upon a foundation of loess, which was recognized as unsuitable for a high dam.

To guard against accident, he built three dams so situated as each to stand one-third of the head. The lower two had no gates; the upper one had gates. All these dams were built in the dry, at one side of the river.

After their completion, a dam was built in the river channel of fascenes, earth and rock, and the water accumulated behind during the low water season. As it was *closed*, the bank was cut above the three dams to allow it to pass through the gates therein provided, but instead of doing so, it cut a new channel leaving the dams high and dry.

In 1895, an engineer named Andreyeff was employed by the Estate to build a dam at Hindu-Kush where a power plant is located, which uses for power the water that runs down the river to Merv, to satisfy prior rights. The power is transmitted to Byram Ali, and used for lighting and running the cotton machinery. The capacity of this reservoir is 10,000 acre feet. There are three valley reservoirs with a combined capacity of 23,000 acre feet.

The canal system from the Hindu-Kush Reservoir was built by Von-Valueff. The main canal was 17 miles in length and is called the Tzar Canal. It has a capacity of 500 cubic feet per second and irrigates 5,000 acres of cotton and 7,000 acres of wheat and barley.

In April and May, 1903, came great floods which filled the Hindu-Kush Reservoir with sediment.

In 1910, Von Valueff built the Sultan Bend and Yolatan Reservoir. These are 12 versts apart. Yolatan Reservoir holds 55,000 acre feet and backs water to Sultan Bend, which is located at the head of the valley, near the site of the original dam built by the Sultan Sanjar in the Twelfth Century.

Most of the structures are built of brick and are very heavy and substantial.

Sultan Bend Reservoir backs water 40 versts and has a capacity of 55,000 acre feet.

The total storage capacity on the Emperor's Estate is about 140,000 acre feet, but this will rapidly decrease with accretion of sediment.

Canal Sultan Yab leads from Sultan Bend Reservoir and is on the same location as the oldest known canal. It has a capacity of 800 cubic feet per second.

The total diversion capacity of the system is about 1,500 cubic feet per second, and serves about 60,000 acres of land.

Cotton, wheat and barley, alfalfa and fruit, are the chief products in the order named.

The next largest stream in Turkestan is the Sir Daria which is, in general, about half the size of the Amou Daria and has a minimum flow of more than 15,000 cubic feet per second. The Sir Daria and the Amou Daria are the only streams in Turkestan which reach the Aral Sea, the rest being lost in the desert or consumed in irrigation.

A large number of small canals have been diverted from the Sir Daria in Ferghana, Samarkand and Sir Daria Provinces. These are used for irrigating temperate zone crops, including grains and forage plants, some fruit trees, a large amount of cotton. A large canal taking water from this river was built as a private enterprise by the Russian Emperor, Nicholas I, which, taking advantage of a series of islands, diverted about 300 cubic feet of water per second into a canal with a length of about 28 miles on the river bottom, and an equal distance over the desert on the bench to the west of the river, all in the province of Samarkand. This system, however, was built on too flat a grade. Its diversion point is unfavorable and unreliable, and the entire canal is located on low ground in such way that it is difficult to carry the water to the fields to be irrigated. The ill success of this system has led to an enterprise on the part of the Russian Government to supersede the existing canal system by means of another heading further up the river and built on a heavier grade, which will command the same lands and a little more. This canal is now under construction and the main canals of the old system will be in the final plans used for drainage.

It appears to be feasible to divert the Sir Daria into a very large canal near the town of Khojend on the left bank and carry the same in a course practically westward to irrigate the vast plain known as the Golodnaya Steppe, where nearly a million acres of very fine land can be found, which is smooth, has an excellent soil, and slope favorable for irrigation. It is probable that the water supply is not sufficient to irrigate this entire tract, but this must depend upon complete adjudication of prior claims to the waters of the Sir Daria.

A PATRIARCH

By THOMAS NELSON PAGE.

DR. HUNTER McGUIRE once related to the writer that having performed an operation on the eyes of a boy, who had been born blind, and given him sight, he asked the lad what was the most beautiful thing in the world, and he answered instantly, "A tree."

This verdict will be endorsed by all except those who have not received their sight. And in their memory will generally stand forth prominent some one tree which excels all others of its kind. It may be some hoary cypress like those of Santa Cruz, bearing on its scarred trunk the marks of centuries; it may be a New England elm, lifting its head to the sunlight in perfect symmetry; it may be a live oak spreading afar its branches to the ground as though to seek with its leaves the moisture about its far-sent roots. Or it may be some mighty oak, towering above its fellows in stupendous majesty.

such a tree I know. A white oak of vast proportions and imposing majesty. On an old Virginia plantation in Hanover County it stands out in a field, a patriarch of the forest, surrounded by its progeny—the offspring of the later years—circled by them like an ancient chieftain surrounded by his body guard. It stands, one of the last relics of the primeval forests of Eastern Virginia, whose glory awed the first Anglo-Saxon settlers when they came to this virgin land.

The original survey of this land for William Nelson based on the King's Warrants is in the writer's possession, carrying no many acres of "King's land" in the "Tracts of Pamunkey," lying between the Little River and the New-Found River, and it has always since been in the possession of the family. From William Nelson the land with this tree, already noted, came down to Thomas Nelson, a signer of the Declaration of Independence, Revolutionary War Governor of Virginia, and Commander of Virginia's forces. Here he died at the age of forty nine, and this oak once shaded the first stable yard of the plantation. No trace of the stable remaining; save this majestic monument which has survived several wars and many generations. One of his granddaughters, now ninety years old, remembers to have heard the oldest son of General Nelson, to whom this estate descended, say that he would never cut the tree down because his father admired it so. Thus the tree was in its prime several generations ago, and Potapomac children must have played beneath its sheltering arms. Today at a foot from the ground it is not less than eight feet in diameter, and cannot be less than five feet at any height below the branches. It must shade at least a third of an acre and beneath its boughs the cattle find their favorite refuge alike from the summer heat or the winter blasts.

In my youth the great tree stood alone in its majesty in an open field, a model of the genus from whose endurance came the term that since the buildings of Rome has stood for robust strength. The field when last cultivated was late, like so much of our Virginia land, in corn beds and along through the 80s grew up in pines, but above this puerile growth towered over the Big Oak, and when ten years ago the writer cleared the field again, he found that the old tree had surrounded itself with a numerous progeny. It stood in the midst of a dense thicket of young white oaks ranged in lines about its base, the rows where the acorns had rolled and sprouted, those nearest the old tree spindling and weak, while those on the outer edge of the circle were vigorous and robust.

On the south side alone the oaks are supplanted largely by cedars, showing where the birds sought the comparative shelter of the south side of the tree and dropped the seed. Glancing down the rows little vistas lead to the center, but as viewed from the side, the grove is impenetrable.

I have been advised by friends to thin out the grove about the old tree, but as he is lush and robust, and has survived alike the crowding of his youth and the loneliness of his later life, and as he has multiplied himself by himself in his old age a hundred children, I shall not dare to enjoy in his own way his glory, and to testify to the genius of generations the majestic grandeur of the Virginia oaks.



HIS MAJESTY, THE OLD ONE



A CLOSER VIEW OF THE OLD OAK.

FIVE STATES UNITE TO SAVE FORESTS

ONE hundred and forty of the leading loggers, lumber manufacturers and forest conservation experts of Montana, Idaho, Oregon, Washington and California met at Portland, Oregon, early in December to attend the forest fire conference of the Western Forestry and Conservation Association. The best methods of forest fire protection, conservation of the forests and reforestation formed the central thought of the convention.

After two days devoted to hearing many excellent addresses and spirited and valuable discussions the convention adopted resolutions urging co-operation by Federal and State Governments and local forestry and conservation associations for the conservation of forests of the Pacific Coast and Pacific Northwest, through proper and adequate means of prevention of forest fires, and urging each forested county to contribute its share of the expense of fire patrol and fire fighting. Appreciation was also expressed of the Federal Forest Fire Service.

E. F. C. Van Dissel, of Spokane, G. M. Cornwall, of Portland, and F. G. Greggs, of Tacoma, were appointed members of a committee to take the matter of securing the use of troops for preventing and fighting forest fires up with the secretary of war, and if existing laws do not permit the head of the war department to comply with the request, then the committee is to undertake securing proper legislation to provide for this need.

The best means for regulating the destruction of debris and minimizing the danger from fire loss was discussed at length. J. L. Bridge, of the Washington Forest Fire Association, favored burning slashings in the fall instead of the spring, because of the ever-present danger that smouldering fires usually remain only to be fanned into a dangerous conflagration at the beginning of the dry season. He urged the necessity of assistance and co-operation between logging operators and timber owners to reduce fire risks.

W. D. Humiston, of the Potlatch Timber Protection Association, argued that it was best to burn slashings as the logging progressed whenever that course was practicable.

F. A. Elliott, State Forester of Oregon, agreed that local conditions determined in a large measure the proper time to burn slashings, although he deemed it better to do this work in the fall.

Better organization, both individual and associate, was recommended by A. E. Adelsperger, of the Coos County Fire Patrol Association, to the loggers if the danger of fire from their operations would be reduced. He maintained that responsibility for all fires resulting from logging operations should be fixed in all cases. Too frequently, he said, the foreman of the logging camp

in his anxiety to make a new record in the output of his camp became careless and neglected the necessary precautions to prevent fires.

A. W. Laird, of the Potlatch Timber Protective Association, charged that carelessness on the part of the foreman of the logging camp, the indiscriminate smoking by workmen and inadequate spark arresters were the most serious menaces to timber. Oil-burning equipment in the woods, he said, was desirable, but he predicted that the demands of safety and economy eventually would force the application of electrical power in all big logging enterprises.

In the discussion of this subject, which was general, one speaker proposed that all cigarette smokers be denied employment in logging camps. Although the suggestion was admitted to have merit, the association took no formal action. Another logger proposed that employers supply their operatives in the woods with patented cigar-lighters, on the theory that many of the forest fires result from discarded cigarette or cigar stumps or the careless throwing of an unextinguished match into inflammable debris.

Taking up the subject of railroad fires, F. A. Silcox, of the United States Forest Service, made the assertion that 40 per cent of the forest fires in the country could be charged to the railroads. Three means of combatting the danger of fires from this source were recommended, as follows: Safeguarding railroad engines by the use of adequate spark arresters and equipping fire-boxes with a mechanical contrivance for preventing the scattering of cinders, clearing right of way under supervision of forestry officials and patrolling the tracks.

Earnest co-operation of the railroad officials in his district, reported E. O. Hawksett, of the Pend d'Oreille Timber Protective Association, had been supplied with the result that the number of fires resulting from railroad engines had been reduced to a minimum.

State Forester Elliott, of Oregon, made the announcement that only 5 per cent of the forest fires reported to his office this year were charged to the responsibility of the railroads. "The other 95 per cent," said he, "were caused by the carelessness of logging camp operators."

George A. Day, personal representative of Governor Hawley, of Idaho, a state with 400,000 acres of timber lands, told of the interest the people of his state had in the subject of forest conservation. The last Idaho Legislature, explained Mr. Day, appropriated \$30,000 for the protection of the forests of the state, which for the year had been thoroughly and efficiently patrolled at a cost of only 3 cents an acre.

George S. Long, of Tacoma, president of the Washington Forest Fire Association, discussed public and private co-operation as the only direct and effective means of combatting forest fires and conserving the forest wealth of the West.

"The entire Pacific Northwest has every cause for felicitation as a result of the earnest, hearty co-operation by the Government, state, forest fire associations and railroads in safeguarding timber resources by providing protection from forest fires," said Mr. Long.

"West of the Rocky Mountains we have a priceless treasure. In that area there are 800,000,000,000 feet of timber, amounting to 50 per cent of the

total standing timber in the United States. This will be sufficient to supply all demands for the next 100 years at the present rate of cutting. Fully 80 per cent of the revenue from this resource remains in the several states for labor in cost of manufacturing and marketing the product."

Taking up the subject of reforestation, which Mr. Long declared was equaled in importance only by the need for applying every preventive measure against loss from forest fires, the speaker declared that 75 per cent of the area west of the Rocky Mountains was suited for nothing better than for growing other forests.

George M. Cornwall, secretary of the association, read a comprehensive paper emphasizing the need for education of the public to the importance of the lumber industry as the primary essential towards cultivating their interest and support of legislation essential to the further conservation and protection of this industry.

THE NATIONAL IRRIGATION CONGRESS

ALMOST a thousand delegates attended the National Irrigation Congress at Chicago the week of December 5 and spent several days in discussing irrigation projects, swamp drainage and forest and stream conservation. Governor Charles S. Deneen, of Illinois, welcomed the delegates and many prominent men addressed the convention. President Benjamin A. Fowler advocated amendments to the national irrigation act and urged the reclamation of swamp lands as two of the most important matters to be discussed by the congress. He laid particular emphasis upon the necessity of draining the swamp lands. It was stated that Illinois has 2,500,000 acres of drainable swamp land which could be converted into highly profitable farming property.

R. P. Tello, of the United States Census Bureau, presented statistics showing that there are 5,636,394 acres available for irrigation on which there are no settlers.

State Senator Fred Whiteside, of Montana, spoke on Government Irrigation in Montana and on Tuesday evening C. J. Blanchard, statistician of the United States Reclamation Service, lectured on "Making the Wilderness Blossom."

Wednesday morning the principal topic was drainage. W. L. Park, first vice-president of the Illinois Central Railroad, spoke of drainage as a basis for development; J. C. Longstreet, of Missouri, state aspect of drainage; Dr. W. A. Evans, former health commissioner of Chicago, stream pollution; Prof. Gardner Williams, of Michigan, the uses of the Great Lakes. A special feature was an illustrated lecture by M. O. Leighton, chief of the hydrographic branch of the United States Geological Survey, his subject being the national aspect of drainage.

On Wednesday afternoon representatives of Salvador, Canada, Germany, Peru and British Columbia made addresses, and Arthur P. Davis, chief engineer of the reclamation service, told of irrigation in Western Asia, illustrating his talk with recently taken photographs.

Irrigation in general was discussed Thursday morning by representatives of the Department of Agriculture. Prof. Samuel Fortier, in charge of irrigation investigations, spoke on the present stage of development and made a forecast of the future. There were also addresses by Milo B. Williams, irrigation engineer of the Department of Agriculture; Judge Geo. H. Hutton, of California, and Col. A. R. Lawton.

Other addresses at the various sessions were by Dr. W. J. McGee, of the Bureau of Soils; Norman E. Webster, Jr., of New York; Dr. John A. Widtsoe, president Utah Agricultural College; Hon. Gifford Pinchot, president National Conservation Association; T. W. Taylor, professor of Civil Engineering at the University of Texas; Willard E. Holt, of New Mexico; E. J. Watson, Commissioner of Agriculture, Commerce and Industry of South Carolina; Hon. Dwight B. Heard, of Arizona; Horace G. Clark, of Colorado; M. O. Leighton, of the United States Geological Survey; Dr. W. A. Evans, of Chicago, and Dr. Harvey W. Wiley, Chief Bureau of Chemistry, Department of Agriculture.

REUNION OF YALE ALUMNI

YALE Forest School graduates to the number of nearly one hundred met in New Haven December 20 and 21 for a reunion. It is little more than a decade since the school was founded, and about three hundred men have been graduated. They have returned to New Haven from all parts of the country, and since graduation have been occupied in Federal, State and private forestry, or in educational lines of the profession. The program of events included the following:

Wednesday, December 20—

9.30 A. M.—Registration and informed reception at Marsh Hall.

11.00 A. M.—Class business meetings.

2.00 P. M.—Program at Marsh Hall.

6.00 P. M.—Class suppers.

8.30 P. M.—General smoker.

Thursday, December 21—

8.30 A. M.—Excursion to Maltby Park.

2.00 P. M.—Program at Marsh Hall.

8.00 P. M.—Banquet.

At the first formal meeting, on the afternoon of December 20, President Hadley, of Yale, and Director Toumey, of the Forest School, gave brief addresses of welcome. The program dealt with what the alumni have been doing since graduation. It consisted of a half dozen ten minutes talks by men representing different lines of forestry. Among those who spoke were State Forester Hawes, of Vermont; Professor H. P. Baker, of Pennsylvania State College; Professor Fisher, Director of Harvard Department of Forestry, and Mr. T. S. Woolsey, Jr., of the United States Forest Service.

The smoker in the evening gave men, of different classes, an opportunity to renew friendships and make new acquaintances. The discussion of various forestry problems was a feature of this occasion. Dr. Hadley presided at the banquet and responses were made by several well known foresters.

The field excursion to Maltby Lake on December 21 gave the classes a chance to see the progress of forest management on the New Haven Water Company's property, which has been for ten years the practice ground of Forest School students in silviculture. The afternoon program dealt with the relation of the alumni to the school. Director Toumey gave a progress report of the school for the decade, which was followed by papers presented by W. B. Greeley, of the Forest Service, also a member of the Forest School advisory board, and others. An opportunity was then given for discussion of the course of instruction needed by men now entering the profession, and an opportunity was afforded for frank expression of opinion in reference to the present courses at the school.

At the evening banquet National Forester Graves and Professor Roth, of the Department of Forestry of the University of Michigan, were to have been honored guests, but owing to illness in the family Professor Roth could not be present. Forester Graves, District Forester Ringland, Pinché, Moore, and others responded to toasts in answer to the call of Professor Toumey, who was toastmaster.

DEVOTED HIS LIFE TO FORESTRY

IN the death at Washington, Pa., early in December, of William Crosbie there passed away a man, whom many of his friends claim, was the originator of the idea of forest preservation in the United States. Born in Linlethgowshire, Scotland, eighty years ago, Crosbie came to America on his wedding trip when he was but 21 years of age. In his native land he had spent several years studying forestry in England and Scotland, being associated with members of the nobility in that work. When he and his bride, a young English girl, went to Washington County, Pa., sixty years ago, to visit, the young Scotchman decided to stay there.

More than forty years ago he took charge of the Washington cemetery, and under his direction its 800 acres have been converted into one of the most notable forest preserves in Pennsylvania. In the cemetery are found 600 distinct varieties of trees, there being every tree that can grow in that climate. Among the most treasured of Crosbie's forest pets are a cedar from Lebanon, a cedar from the Himalayas and a Japanese cedar, all imported at considerable expense and all flourishing in their adopted land.

Half a century ago Crosbie began writing on forest preservation and civic beautifying. At first his communications were addressed to the local newspapers with the signature of "Forester," and the suggestions he offered have been carried out in the beautification of the town.

Crosbie, in his zeal for the trees, did not stop here. While still little more than a boy he began writing to the government heads at Washington, urging a forestry commissioner and definite steps to preserve the forests of the land. In the administration of General Grant his ideas so impressed the chief executive that he sent a special recommendation to congress. The recommendation met with the approval of the house of representatives, but was

killed by the senate. Crosbie kept up his agitation and work, however, and lived to see his hopes realized.

DEVELOPMENT OF TIMBER RESOURCES

OPTIONS on over 250,000 acres of timber land in western North Carolina have been secured by the Asheville Timber Company and there has been undertaken the greatest development of timber resources ever known in that section.

The properties secured include over 250,000 acres and contain about one billion two hundred and fifty million feet of spruce, six hundred million feet of hemlock and one billion, one hundred million feet of hardwoods. Practically all the properties are virgin forests and of the very highest grade. Among the hardwoods are the best stands of poplar and cherry that ever grew in this section.

A feature of the woods management will be the placing of the operations substantially under the United States forestry supervision which has opened headquarters in Asheville and is taking options on large tracts of land. The government is planning to install a fire protecting system which will minimize the risk from forest fires.

A notable feature of the development is the complete utilization of all the saw dust and other mill waste from all the mills, at one central power plant, converting it into electric power to run all the mills and factories from which the waste is produced, besides a surplus to operate the big ground wood pulp mill, which is a large consumer of power. The operation of all the plants by electric power eliminates the fire risk to the utmost, and it is contemplated that practically all the buildings will be of concrete.

FIRST PURCHASE UNDER WEEKS LAW

THE first purchase of land under the Weeks law authorizing the creation of the Appalachian forest reserve was authorized at a meeting of the national forest reservation committee in the office of Secretary of War Stimson, chairman of the commission, on December 9. Ten tracts of mountain land, aggregating 18,500 acres in McDowell County, North Carolina, were decided upon by the committee for purchase. The tracts range from 100 to 10,160 acres in size and are located near Mt. Mitchell in the western part of the state and are declared to be excellent for practical forest work. The prices range from three to six dollars an acre, the total cost amounting to about \$100,000. All the tracts are on the watershed of Catawba River, an important tributary of the Wateree River, which with the Congree forms the Santee, a stream of much industrial importance, which with its tributaries is navigable for 250 miles in South Carolina. In taking favorable action upon these tracts the commission was unanimous in the conclusion that it had selected one of the most favorable localities of the southern Appalachian region

the application of the Weeks law, the purpose of which is the protection and control of the watersheds of navigable streams.

All of the tracts are contiguous, or nearly so, and will form an area large enough for administration purposes and for the demonstration purpose of practical forestry in this portion of the Southern Appalachians. The forest survey had made a careful examination and had reported on the character and value of the land and timber. The geological survey's report said that federal control of the lands will prevent excessive soil wastage and erosion which is likely to ensue if such control is not established. The prevention of excessive erosion, it added, will tend to promote and preserve the navigability of the Catawba River within the watershed of which the district lies.

The commission reaffirmed the announcement made early in the summer that it will not pay any speculative prices for land and will not purchase any land which will not conduce directly to the purposes of the act.

The commission consists of the Secretary of War, the Secretary of the Interior, the Secretary of Agriculture, Senators Gallinger, of New Hampshire, Smith, of Maryland, and Representatives Lee, of Georgia, and Hawley, of Oregon.

SOME FORCEFUL RESOLUTIONS

At the annual meeting of the Empire State Forest Products Association in November, a number of forceful resolutions were passed pledging the influence and support of the Association in various phases of forestry conservation now under way in New York State.

Among them are the following:

RESOLVED, That we approve the bill known as the Jones bill, which was passed by the Senate and Assembly at the last session of the Legislature, and which provides for the exemption from taxation of lands dedicated to reforestation purposes, as we believe that such a law will encourage the use of such otherwise waste land, for the propagation of forest trees, and the increase of forest area of the State, and this Association further respectfully requests the Governor and Legislature next assembling to adopt some such provision.

RESOLVED, That we endorse the public spirited, unselfish efforts of the Camp Fire Association to investigate, and, under the able and intelligent direction of the Hon. Gifford Pinchot and Hon. Overton W. Price, suggest improvements in the methods employed in lumbering the Adirondack forests; and we pledge our co-operation in support of any reasonable reforms, and in establishing rational scientific forest management, with due consideration to our business and commercial interests.

RESOLVED, That we express to the Association for the Protection of the Adirondacks our honest desire to confer and co-operate with them for the purpose of harmonizing the several interests in the Adirondacks, to the end that this vast estate of the people may be operated and maintained for the greatest good of the greatest number.

WHEREAS, The experience of practical lumbermen proves conclusively that the prevention of forest fires will do more to conserve our forest wealth, both present and prospective, than any other one thing; therefore, be it

RESOLVED, That the Empire State Forest Products Association is in favor of strengthening, extending and perfecting the laws relating to the prevention of forest fires and the protection and patrol of our forests.

WHEREAS, The forced interpretation of Section 7, Article 7, of the State Constitution, by various State officers, has resulted in preventing the people of this State from enjoying their rights in the Adirondack Park,

RESOLVED, That the Conservation Commission be requested to pass regulations which will place an intelligent interpretation on said Section 7, Article 7, and permit the use of the dead and down trees for camp fires and other purposes, and will permit the building of roads and other means of cheap and ready transportation.

RESOLVED, That the Empire State Forest Products Association heartily approves the farsighted constructive policy of our honored Governor, John A. Dix, in creating the State Conservation Commission, and in entrusting to its hands the management and development of the great natural resources of this State, and we heartily pledge our earnest co-operation in this great work.

The London, England, Standard says: "Steps must be taken to secure a larger supply of trained woodmen before any extensive scheme of afforestation is attempted. Until 1904 there was no school in the United Kingdom where young working men could obtain theoretical and practical instruction in forestry."

The second annual meeting of the North Carolina Forestry Association will be held sometime during the latter part of January, 1912, probably at Raleigh. The forestry movement has advanced with leaps and bounds in most of the other states and North Carolina cannot afford to hold back any longer where she has so much at stake.

Although the forest fire season is over, State Forester Cox, of Minnesota, expects to have much real work for his rangers and patrolmen during the next few months. The principal work will be to enforce the law regarding the burning of slash and tops where there are logging operations.

The Detroit Free Press says: "A visitor in Detroit recently made the rather striking statement that Uncle Sam is beginning to make money out of his forest reserves, offering as proof the information that the timber cut during the last year will bring in a revenue of \$2,000,000."

District Forester E. A. Sherman, of Utah, reports that the wool growers of the San Pete country all unhesitatingly state that the range this year was in better condition than it has been at any time since the creation of the Manti National Forest. There was an abundance of feed for their stock.

People residing in Minnesota and in several of the adjacent states have, during the past summer, purchased two thousand acres of timberland in Beltrami County, Minnesota.

THE ADIRONDACK PROBLEM

A REPORT MADE BY HON. GIFFORD PINCHOT TO THE CAMP-FIRE CLUB OF AMERICA, NEW YORK CITY, DECEMBER 2, 1911.

FORESTRY in the State of New York is flourishing everywhere except in the woods. This is the essential fact in the present situation. The Constitution forbids the practice of forestry on State lands, and scarcely a single tract of privately owned forest, either in the Catskills or the Adirondacks, is today being cut under the rules of practical forestry. On the other hand, within the last ten years the destruction of forests by fire and bad logging has been greater than ever before.

The Adirondack forest is one of the most precious possessions of the people of the State of New York. In conserving water-flow and supplying timber, as a recreation ground, and as a vast sanitarium, it is indispensable to the growth and welfare of the State. The purchase of the Adirondack Park is probably the best investment the citizens of New York ever made.

The Adirondack Preserve consists of all State lands in the twelve Adirondack counties, and includes about 3,300,000 acres. The Adirondack Park includes only State lands within the so-called "blue line," 1,500,000 acres in area, or about half the total area the "blue line" bounds.

The other half is owned by lumber companies, associations, clubs and individuals. Substantially all of it is useless for any other purpose than to grow trees. The tree growth upon it, however, renders so many and such important services that no similar forest area in the United States is of such high value to so many people.

The object of this report, prepared on behalf of the National Conservation Association for The Camp-Fire Club of America, is to make it easier for the people of New York to get the benefit of the Adirondack forests, and to protect them against waste through mis-use and non-use.

The first duty of the State towards the North Woods is to protect them from fire. Because of previous neglect not less than a quarter of the whole area has been burnt. Of late, and especially since the great fire of 1908, good work by the State fire patrol has much reduced the number of fires. But it is not enough that there should merely be fewer fires in the Adirondacks. There should be no fires there at all.

NEED OF FIRE PROTECTION

The principle of controlling a fire in a forest is precisely the same as that of controlling a fire in a city. The essential thing is to get the necessary fire

fighters on the spot without the needless loss of a second. To this end mountain outlook stations have been established through the Forest Preserve and connected by telephone with villages and towns, so that fires may be promptly discovered and fire fighters concentrated upon them with the least possible delay. The foundation for an admirable organization has been laid, but at least ten additional stations are required.

Every forest officer in the Adirondacks should have a list of the most willing and efficient men for fire fighting in his locality and where they can be reached, so that in case of emergency he may make the promptest use of the law authorizing him to call men out to fight fire. Organizations of citizens should be formed to supplement the salaried force, and further definite arrangements should be made in advance for gathering men, equipment and supplies without loss of time when the need arises.

The present cost of fire protection is six tenths of one cent per acre per annum for a property whose average value in timber alone is not less than ten dollars per acre. Stated in another way, there is but one fire patrolman on forest lands in the Adirondacks to one hundred thousand acres. Lumbermen in some of the Western States are now spending nearly four cents an acre for fire protection on lands of their own, which are no more valuable in money and far less important to the community than the North Woods. More than double the present force is badly needed.

The present fire law, which rigidly forbids any burning of brush at certain seasons, regardless of the weather, and permits it at certain other seasons, equally regardless of the weather, often increases the danger from fire. Burning should not be allowed at any time except under permit, and with the personal presence and supervision of a forest officer.

The law now requires that the tops of coniferous trees shall be lopped immediately after felling. The snow crushes lopped branches close to the ground, so that they keep moist, rot more promptly, and lessen the risk from fire. Some criticism has been made of the value of lopping tops. From personal observation on land lumbered as much as twenty years ago where no tops were lopped, and on similar land in the Adirondacks lumbered ten years ago where lopping was practiced, I can assert with confidence that lopping does accomplish its purpose in making the forest safer against fire. Spruce tops honestly lopped rot down in ten years more thoroughly than unlopped tops in twenty, and even at the end of six or seven years present little or no material to feed a fire. Fire on areas well lopped is much easier to fight than on unlopped lands, reproduction of the forest is not hampered, and the general effect is entirely good.

TRAINED FOREST FORCE NEEDED

The efficiency of a forest force depends less on good laws than it does on good men. In the past the State forest force has at times been composed largely of political appointees, and has suffered in consequence. While a great improvement in the force has taken place, I recommend strongly that this im-

government be maintained and increased by requiring all members of the forest force to pass a Civil Service examination before appointment, and by giving permanent employment to as many men as possible. Some temporary men would always be required, but men employed during only a part of the year take less interest in their work and render poorer service than members of a regular force who expect to follow one line of work during their lives. Forest government, and, indeed, the State cannot compete for the best men with other employers and will have to make when they come. The thorough enforcement of the existing law would require the services during the winter of the larger part of the present force.

The Civil Service examination the men must pass and should be made thoroughly practical by testing as to their training and experience as woodmen and as foresters, and their local knowledge of the country in which they are to work. It is a common fact of general knowledge and has been admitted in the forest. This question applied in the National Forests of the United States has demonstrated more than any other single cause to the detriment of the forest.

The salaries of the foresters are too low. They should be increased from \$40 a month as at present to \$50 a month, with the addition of reasonable premiums for good work. In every practicable case, opportunities to merit promotion should be made by promotion and not on the salary list of men outside the present force. The title "forester" should be changed to "forest ranger" for the duties are very much wider than the present title.

The Adirondack Park contains not less than 10,000 acres of forest land so completely denuded by fire that planting is necessary. In many places not only the forest but the soil itself has been washed away by fire and the bare rock is exposed. There is also about 50,000 acres on which planting is desirable to reinforce the present sparse young growth. It is most fortunate that the State is admirably prepared for the planting work. Its forest conserves under the direction of Mr. C. R. Harris, Superintendent of State Forests, have become models both as to the quality of the stock produced and the low cost of growing to while the forest plantations set out by the State are among the most successful in any country.

During the last few years very little forest planting has been done in the State and because the sale of seedlings to private owners at cost has never really been the chief product of the nurseries. However, much it will be able to buy seedlings to in the State, but it is at least equally important that the State should begin on an adequate scale and without further delay its own great task in forest planting. For this purpose the capacity of the nurseries has recently been increased to produce about eleven million young trees a year. At least 5,000 acres a year should be planted up. At this rate, if no more land is devastated by fire, it will still require a century of a century to reforest the denuded State lands within the Adirondack Park.

PROOF OF PRACTICAL FORESTRY

The results of work done on the Webb and Whitney tracts under my general supervision and under the direction of Mr. Henry S. Graves, now Chief of the United States Forest Service, have proved beyond contradiction that forestry is practical from every point of view in soft-wood logging in the Adirondacks. On both these tracts, whose total area is over 100,000 acres, each tree to be cut was marked, and as a rule sound spruce trees below ten inches in diameter were left standing. Dead trees enough were left to provide for a second crop, the forest cover was conserved by moderate cutting, simple rules were enforced to prevent waste of timber and injury to young growth in the logging, and the tops of felled trees were lopped as a safeguard against fire.

The forest was improved and the work paid. The proportion of spruce trees in the woods is already increased, and the older cuttings are even now ready to produce a cut of spruce as valuable as the first crop. The beauty of the forest is unimpaired, and there is little sign, except the abundant young spruces, an occasional moss-covered stump, or the trace of an old logging road, that the forest was ever lumbered at all.

But in face of these notable exceptions, and of a quarter of a century of explanation and agitation, conservative lumbering in the Adirondacks has made little or no progress. The usual destructive treatment of private timber lands today makes it perfectly clear that the general adoption of forestry in the Adirondacks can be brought about by law, and in no other way. This is true in spite of the fact that in very few places in the United States is the financial and physical opportunity for practical forestry so good as it is here. Yet nowhere has needless destruction gone further.

It is time to stop playing with the situation. Ostensible efforts at private reforestation, in which tens of acres are replanted for hundreds or thousands that are destroyed, merely serve to distract attention from the main issue. What is needed on privately owned timberlands is the proper handling of the forest, and not inadequate replanting after its destruction. The present method, if allowed to continue, will inevitably result in the devastation of substantially all the Adirondack timber lands held for lumbering purposes, as well as in the burning of large areas of State lands by fires starting in the slash thus caused. And in the end the State itself will be forced to take over these denuded lands and replant them at great expense.

More is done to help the lumbermen by the State of New York than any other State in the Union. The maintenance of the mountain lookout station and the cost of fire patrol is paid for entirely from the State funds. In several Western States the lumbermen voluntarily bear these expenses themselves. When a logging crew is requisitioned by a New York forest officer to fight fire on the land of a lumberman, that lumberman is reimbursed for the time spent by his own men in protecting his own property. State taxes on forest land in the Adirondacks are negligible, while other taxes are generally based on so low a valuation that they do not hinder forestry. Yet in spite of all this, these mountain forests, in which every citizen of the

State has a real interest, continue to be destroyed without let or hindrance. It is time to stop.

I would not be understood as charging that the Adirondack lumbermen as a body are bad citizens, or that they are purposely injuring the State which protects them. On the contrary, many of them are anxious to improve the present unfortunate conditions. For example, the Emporium Lumber Company, which owns about 82,000 acres of Adirondack forests, has agreed to carry out a plan for cutting, to be prepared by the writer, on an area of one square mile, as a first step toward what I hope will be the conservative logging of the whole tract. As Mr. W. L. Sykes, President of the Company, well says, the difference between conservative logging and forest destruction is that in the one case the timber land is an increasing asset, in the other a diminishing one.

PRACTICAL LEGISLATION REQUIRED

One of the most important recommendations I have to make is that The Camp-Fire Club shall invite a Committee of the Empire State Forest Products Association to join with a committee of its own in working out the details of practical legislation, which shall protect the interests of the lumbermen at the same time that it prevents the destruction of the forests. Mr. F. L. Moore, President of the Association, has already expressed his entire approval of this plan. The Conservation Commission should be represented at any such conference by the Superintendent of State Forests. In my judgment, a perfectly practicable scheme can be worked out under which the added cost to the lumbermen of practicing forestry as against destroying the forests should seldom if ever exceed a cost of 25 cents per thousand feet of logs cut.

But not all of the Adirondack lumbering concerns are controlled by men of good will. A peculiarly aggravated case of needless and conscienceless vandalism is supplied by the Brooklyn Cooperage Company, a subsidiary organization of the Sugar Trust. The logging done by this company is more destructive than any other with which I am acquainted in the Eastern States, and the damage by fires for which its carelessness is said to be responsible, will cost the people of New York large sums of money and long years of time to repair. When requested by the Conservation Commission to take simple and necessary precautions against fire, it peremptorily refused to do so.

The Brooklyn Cooperage Company controls by ownership and lease 123,000 acres in the Adirondacks. Unless this organization is restrained by the strong hand of the State, every acre of that land will be despoiled of its forest growth and swept clean by fire.

In my judgment, to destroy in this fashion forests whose destruction hurts the State is as much a mark of bad citizenship as for a man in town to set fire to his own house. There is no more moral right in the one case than in the other; and the time is rapidly approaching when there will be no more legal right either.

I recommend the passage of a law which will require the lumbermen

inside the Adirondack Preserve to carry out such a degree of practical forestry on their timber lands as will reduce the damage from fire to the lowest practicable point, and insure the perpetuation of the forest. In each case the plan of work should be approved and its execution should be supervised by the Conservation Commission through the Superintendent of State Forests, who is now and always should be a trained forester. The State should prepare practical cutting plans for lumbermen at their request, and siderable increase should be made in the number of trained foresters now otherwise assist with information and advice, and for this purpose a con-available.

DISPOSAL OF PRIVATE LANDS

To compel private owners to cease cutting altogether on certain mountain lands which should be kept untouched for the protection of the slopes and of the water supply, would be an unfair burden upon them. The private lands of the Adirondacks should therefore be divided into so-called "protection forests," on the steep high slopes, which should never be cut at all, and the commercially valuable timber on the lower slopes and rolling lands, upon which cuttings should be regulated by the State. As rapidly as possible the State should acquire the protection forests and look after them.

Section 7 of Article 7 of the New York Constitution is as follows:

The lands of the State, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber be sold, removed or destroyed.

In practical effect this section does more to limit and restrict the use of the Adirondack Park by the citizens of New York than all the other causes combined. Under it citizens of the State are prevented from constructing cheap wooden camps along the borders of lakes and streams controlled by the State, leaving the wealthy owners of elaborate so-called "camps" undisturbed by the proximity of poorer neighbors. The purchase of camp sites on private lands, even if any were still available, is beyond the reach of persons of average means. Such camp sites, I am informed, have sold for as much as \$100 per foot of water front.

The State should lease small camp sites on terms which will encourage the enjoyment of the Park by as many people as possible, keeping open, however, not less than one-quarter of every lake and stream for the general public. The use of the State lands by every man, woman, and child who can manage to get there should be assisted and made easy in every practicable way. The lessees of camp sites would constitute in effect a large volunteer fire department constantly on guard, to whose personal interest it would be to prevent or put out every fire.

Section 7 likewise prohibits the construction on State land of roads and trails needed to make the people's property accessible to the people. It is well known that roads and trails form an admirable protection against fire. Because of their absence the Adirondack Park is needlessly exposed to the risk of conflagration.

In another way also this section increases the danger of fire on State lands. Substantially all of the recent State purchases consist of logged or burned land, containing great quantities of dead and down brush and timber. The removal of these fire traps is now forbidden by Section 7 and the danger from fire correspondingly increased. In some cases while great quantities of timber are decaying on the ground, green trees are necessarily cut at increased expense to supply the indispensable fuel. Already those who live in villages surrounded by forests owned by the State, must pay excessive prices for firewood brought in from private lands.

Under this section the development of water power by storage on State land is forbidden because it cannot be done without killing some trees. Thus one of the principal resources of the State is kept unused, without any corresponding benefit to the people.

Section 7 forces the State to hold lands outside of the "blue line" boundary of the Adirondack Park, which in many cases are far more valuable for cultivation than as forest. It ought to be possible to exchange those small isolated areas of State land, now merely a burden and expense, for land inside the "blue line" which the State really needs for park purposes. Some extension of the "blue line" is required, in order that it may enclose all Adirondack forest lands whose protection is urgently needed for the general welfare.

When Section 7 of Article 7 was included in the Constitution, there was good reason for doing so. At that time the recent history of the Adirondack Park contained a malodorous series of transactions in which at every turn the State got the worst of it. Not without cause the people of the State came to believe that the only way to save the Adirondacks from mis-use was to forbid them to be used at all.

PUBLIC SENTIMENT AROUSED

The situation today is entirely changed. In my judgment, the people of New York may now safely trust themselves to administer their own forest property with honesty, sagacity, and skill. The State of New York now has a forest department governed by safe standards of public service, and actually accomplishing results of real public value. The supply of trained foresters in the United States is fortunately sufficient to enable the State of New York to build up the necessary force under the direction of the Superintendent of Forests. Public sentiment is now generally aroused and informed as to the value of the people's property in the Adirondacks, so that a repetition of the old mismanagement has become impossible. To continue to lock up the Adirondack Park against use will do no good and much harm.

It is not as well known as it should be that Adirondack land may be lumbered and the product put to use, not only without injuring the forest, but to the improvement of its condition and value. The public mind has been somewhat confused by the unfortunate experiment on the Cornell lands at Axton. The practice here was directly opposite to that on the Webb and Whitney tracts above referred to. At Axton the logging destroyed the forest

cover by cutting clean. It was financially unprofitable, so that money to replant ran short. For the same reason, the slash was left on the ground, a promptly accepted invitation to forest fires. Finally, the Cornell experiment did not conform to the first principle of true forestry in the Adirondacks which is to secure natural reproduction from seed trees left standing after cutting only trees carefully selected and marked.

SOME PERTINENT ADVICE

Good forestry on State lands in the North woods demands cutting so moderate as not to destroy forest conditions, or seriously disturb the forest cover. Practical forestry in the Adirondack Park should begin slowly and at first should cut not more than 1% of the Park each year. The first consideration in all cuttings should be to improve the forest. Clean cutting should be forbidden by the Constitution. So should cuttings so heavy as to impair or interrupt the forest condition or require the planting of trees after logging. All logging in green timber should be directed to encourage young growth, and all sound spruce trees below fourteen inches or hardwood below eighteen inches in diameter should be left standing.

Before the Constitutional question whether practical forestry shall be permitted in the Adirondack Park is submitted to the people for action, the Conservation Commission should be called upon to lay before the Legislature and the people a full description of the methods of practical forestry which it is proposed to apply, and the results these methods are intended to secure.

In a virgin forest, as the young trees grow up, the old trees die and fall to the ground, thus supplying fuel for forest fires. In a properly handled forest, mature trees are cut down and the slash disposed of, so that an Adirondack forest carefully and properly logged presents no greater invitation to fire than one not logged at all.

The timber in a virgin forest does not increase in quantity, because the growth of the young timber is offset by the death and decay of the old. But in a well handled forest the amount and value of the standing timber steadily increases. The result of practical forestry in the Adirondack Park will not be to decrease the future supply of timber, but to husband and increase it. It is not only to the interest, but it is the duty, of the State to put its forests in the best possible condition to be useful to the people. That cannot be done without the wise use of the axe.

The wide use and more efficient protection of the Adirondacks demand a change in the Constitution. Without attempting to use exact legal language, I suggest that Section 7 of Article 7 might well be amended to read somewhat as follows:

"The lands of the State, now owned or hereafter acquired, constituting the Adirondack and Catskill Parks as fixed by law, shall be kept as forest lands. They shall not be sold or exchanged, or be taken by any corporation, public or private, and no timber shall be cut on said lands except in accordance with the principles of conservative forestry, nor shall the permanent forest

conditions of any such land be interrupted, endangered, or destroyed by clean cutting or otherwise."

Since The Camp-Fire Club does not desire at this time to take up the question of water power, I have to add merely that the principles upon which this part of the larger problem of the use of the Adirondacks should be decided I believe to be these:

First.—State development, ownership, construction, and control of water power on State lands.

Second.—Fair compensation to the State for the use of power thus created.

Third.—Regulation of rates charged to the ultimate consumer.

Fourth.—Coöperation with the National Government for the complete development and control in the public interest, of all power on navigable and other streams within the State.

This report is based on the field work and experience of Mr. Overton W. Price, my associate in the United States Forest Service and the National Conservation Association, and myself. It ends as it began. Forestry is flourishing in New York everywhere but in the woods. The time is ripe for a change.

Game wardens of the northeastern section of Pennsylvania have caused arrests during the last few weeks since the hunting season opened of a number of hunters found lighting fires in the woods, thus preventing a number of destructive forest fires which spread rapidly in the sections where the timber is mostly second growth.

State Forester Cox figures that the average annual fire loss in the woods of Minnesota is \$5,000,000. This appalling figure he justifies by statistics that withstand criticism. An annual appropriation of \$75,000 is all that the legislature has made to use in work towards preventing this loss.

Parties who have spent part of the summer in the Olympic Mountains found that lightning is undoubtedly responsible for many forest fires. The trees were found splintered by the lightning and areas for miles square were burnt over adjacent to these trees.

Do not overlook the fact that a very desirable Christmas present for a friend, costing but three dollars, is a membership in the American Forestry Association and a subscription to this magazine for a year.

Assistant District Forester T. C. Hoyt, of Utah, has gone to Boise, Idaho, for the purpose of inspecting a recent claim in controversy on the Southern fork of the Payette River in the Boise National Forest.

STATE NEWS

New Hampshire

Speaking of the development of the forest policy of New Hampshire, Governor Robert P. Bass, of that State, in an article in the *Christian Science Monitor* says:

"There is developing throughout New Hampshire an appreciation and practical understanding of the importance of forestry. It has been estimated by experts of the United States forest service that about 60 per cent. of the land surface in the State is better suited to the growing of forests than farm crops. A great deal of this land, though too rocky or steep for farming, has good soil and produces rapid tree growth. These natural forest soils being near the large markets will enable the owners more and more to sell all the products of the forest at a profit.

"The forest policy of the State is developing along three lines—the protection from fire of timber now standing and the young growth coming on; the reforestation of waste or unproductive land, and the acquisition of forest land by the State and the United States.

"The system of fire protection is based on coöperation between the State and the towns. A warden is appointed in each town to have charge of fire fighting, the State and towns sharing equally in the expense. The State directs the work of the wardens and operates 15 mountain lookout stations for the discovery of incipient fires.

"A notable feature of the fire protection work is the organization of the timberland owners of northern New Hampshire, who have formed a coöperative association representing an ownership of over 1,000,000 acres, on which they assess themselves one cent per acre per year, and use the fund for patrol in times of drought, for additional lookouts and for the establishment of caches of fire-fighting tools in convenient places.

"New Hampshire was the first State to benefit by the Weeks act. During the summer of 1911 a coöperative agreement was entered into with the Secretary of Agriculture by which the State received the services of 24 federal patrolmen.

"The reforesting of cut-over land and waste land has enlisted the interest of small owners for a number of years and is increasing rapidly. Within the past two years several large owners have begun reforesting operations on an extensive scale. The State operates a forest nursery for the distribution of young trees, and two commercial nurseries are successfully growing forest tree seedlings on a large scale.

"The public ownership of forests has been strongly urged by New Hampshire for the

past decade. This is especially important with high mountain forests, where the growth is so slow that private capital cannot handle them as conservatively as they should be handled to protect the forest cover for the scenic effect and the regulation of stream flow. It is to be hoped that under the Weeks act the United States will soon acquire a large amount of the White mountains as a national forest.

"The sentiment in favor of State ownership has increased to such an extent that the last Legislature passed an act for the purchase of the Crawford notch as a State forest. Three small tracts have been received by the State as gifts. Such tracts should be used as forest experiment stations to stimulate an interest in private forestry. In this connection it is noteworthy that a number of towns own small tracts of woodland which could be made quite profitable."

Maine

Forest Commissioner Mace, of Maine, says that lightning was responsible for the majority of forest fires in Maine last summer.

"The majority of these fires," said the Commissioner, "were traced back to the starting point. They always buck the wind.

"The big Frenchtown, Lobster Mountain, fire was started by lightning striking a green hemlock. We found the hemlock which it hit. The fire on Enchanted Mountain, which burned over 8,000 acres was started by lightning, as was the Pine Stream and Deer Pond fires."

Mr. Mace says the result of the year's work has demonstrated the value of the fire patrol and lookout service. In consequence of this branch of the State's work many millions of dollars' worth of lumber has been saved. He points out that Maine has between 9,000,000 and 10,000,000 acres of timber land worth \$45,000,000 and with all the great fires which raged in the State during the summer the total loss will not much exceed \$200,000. This, he says, could only have resulted from the efficiency of the service.

Massachusetts

The fire lookouts stationed by the forestry department in various sections of Western Massachusetts during the past few weeks have been relieved for the winter, but their service has covered a sufficient period to make the success of the plan very apparent. The fall has not been as dry as those of the past few years, and the danger from forest fires has been correspondingly decreased, but several cases have been reported where the lookouts have discovered fires soon after they

started and by prompt notice to fire wardens in the vicinity have brought about the extinguishing of the fires before they had reached dangerous proportions. The danger from fires is usually far greater in the spring, and it is understood that the lookouts will go on duty then, probably in April. Faithful work by the lookouts in a dry season is sure to mean a big saving of property, and the system is one that should be maintained.

New York State

New York State now has on hand 11,000,-000 trees to be used in replanting denuded State lands and for sale to private land owners at cost. With the establishment of a new nursery this year and the extension of the old nurseries, the output of trees next year will be doubled. Within three years, at the present rate of increase in public and private tree planting, at least one tree will be started for every one cut down. It is estimated that last year five trees were destroyed to every one planted.

Maryland

Fire protection has been afforded forests in Washington, Garrett, Allegany, and Frederick counties, Md., by the Department of Agriculture in cooperation with the State authorities. The government will spend \$600 during the year for forest patrols and other protective measures.

The State authorities have selected the patrolmen, and these will follow a route determined by maps of the localities.

North Carolina

Daniel W. Adams, of the Forest Service, has examined 5,000 acres of land in Burke Township and will report on it to the Forest Commission. The commission will consider about 120,000 acres situated in the Nantahala, Mount Mitchell and Pisgah areas in North Carolina, the Savannah area in Georgia and the White Top area in Virginia and Tennessee.

These lands will be recommended to the commission by the field force who examined them. Mr. Adams said that there is a great deal of land in the Pisgah and Smoky mountain areas which the men in the forest service have been unable to reach yet owing to insufficient field force.

Mr. Adams is enthusiastic in his efforts to have the State avail itself of the \$200,000 available annually from the government for the next five years for the purpose of keeping down and fighting forest fires in the sections in which lands will be purchased by the government.

Kentucky

The women of Kentucky are actively working in the interest of the forestry bill which is to be presented to the legislature and are arousing a great deal of influence in favor of the bill. At a meeting of the Legislative Committee of the Women's Club of

Louisville, the other day, Mrs. Mason Maury of Louisville gave an analysis of the present condition of the timber resources of Kentucky and the workings of the proposed bill, which is designated as "an act to establish a State board of forestry, and prescribing its duties."

"Our annual timber growth is at a minimum," said Mrs. Maury. "We are cutting wood but not producing. At the present rate of consumption sixty-five counties will be without merchantable timber in from two to eight years. The value of the timber as it leaves the forest is \$24,000,000 annually, and it rests with us whether or not we preserve this enormous income, which affects the prosperity of every citizen, or whether we supinely allow the destruction of Kentucky's forests.

"If it is to be saved, we must have better forest management, educative and legislative."

In this connection Mrs. Maury suggested a course in forestry be included in the curriculum of the public schools, even if other courses of study be eliminated or abridged.

At the close of the address a vote of approval on the part of all present at the meeting, whether members of the club or not, was given the plan as outlined by Mrs. Maury, and support for the measure promised.

Arkansas

Forest Supervisor Francis Kiefer says of the forestry work in Arkansas:

"The greatest progress of the year was the improved efficiency of the fire protection service throughout the national forests in this district. This marked advance is due to better organization of the fire fighting force.

"Eighteen look-out stations will be erected in the Ozark and the Arkansas national forests upon the highest mountains, which will enable the watchmen to see every part of the forest. Every tower will be equipped with a range-finding instrument and a chart; and a fire may be located the minute it starts. A telephone connection with the Forest Rangers will bring out the fire fighters at once.

"While it is true that whole forests are not consumed here as the big fires in the Rockies and the Northwest are, the effect is no less damaging. The young reproduction, which represents our future forests, is entirely destroyed in case of fire, and, although it is replaced, it consists mostly of sprouts and revived seedlings, which never can make the healthy growth of seedlings unscathed by fire. The forest floor, the grass and leaves, is wholly destroyed whenever there is a fire.

"The coöperation of the settlers in the national forests in fire protection is a great aid in the suppression of fires."

Colorado

District Forester Smith Riley, of Colorado, is preparing a recommendation that 20,000 acres on the watershed of Pike's Peak be re-

forested. This action is the culmination of five years' experiments in tree planting in that district, during which 750 acres have been reforested. An appropriation of about \$100,000 is necessary, and if it is granted the work of turning the slopes of Colorado's most famous mountain into a vast forest will begin next year.

The task will be a gigantic one. An average of 1,000 trees will be planted on each acre, which means 20,000,000 trees. Yellow pine and Douglass fir will be the species used. These trees reach a size sufficient for railroad tie manufacture in about ninety years. The effect of their presence will be seen in the water supply of the district long before they reach that growth, however.

The officials have selected Pikes peak for the first great Colorado reforestation enterprise principally because Colorado Springs, Pueblo, Victor and a thickly populated agricultural country get much of their water from its slopes.

The effect of the new forests will be seen in a few years. The trees and other vegetation will check the melting of the snow in spring, thus distributing the spring floods through the "dry" months.

This forestry district collected last year 12,000 pounds of pine and fir seeds in preparation for this and other reforestation ventures. Each pound represents approximately a bushel of cones and costs about \$1.

California

The Federal Department of Forestry located at Los Angeles has begun the work of reforestation on the southern California national reserve. This is under way in the Santa Ana canyon near Seven Oaks. At that point 40,000 conifers, hardy varieties of pine, fir and redwood will be planted.

San Diego is perhaps the first of American cities to inaugurate a great forestry enterprise in the expectation of speedily decreasing the rate of taxation and possibly of ultimately relieving the citizens of all payment of taxes for the support of the city government. The city owns 7,000 acres of land, which up to the present time has been unproductive. Forty thousand seedlings of the eucalyptus tree have been set out. The city officials expect when the forest is twenty-five years old it will yield \$175 worth of timber per acre annually. That means \$1,225,000 a year. With expenses deducted, this will leave a profit which will go far toward reducing the burden of taxation.

Oregon

Plantations of useful trees are to be established in Eastern Oregon in the districts where the settlers are finding need for nearby fuel supply and timber for fence posts. The State Forestry, in connection with the Forestry Department of the State Agricultural College, will carry on experiments to learn tree-planting possibilities.

Plantations will be started to learn what trees makes the best growth in Eastern Oregon soil and the information will be furnished to ranchers so that they may have the benefit of this experience in developing their farm lands. The inquiry will be extended to determine the best shade and ornamental trees for the various sections of the interior.

Indiana

E. J. Hancock, Secretary of the Indiana Forestry Association, has just completed the organization of the Cass County branch of the Indiana Forestry Association. Already twelve counties in the state have been organized and will work in connection with the central body toward preserving the forest land of the State, stimulating interest in the care of trees and in the planting of new ones.

The Cass County Horticultural Society, already well organized and with a particular interest in the care, preservation and growth of fruit trees, will form a valuable aid to the forestry society.

Governor Marshall, former Vice-President Fairbanks and other leading men of Indiana are members of the forestry association and have volunteered their services in any county where auxiliary branches are being formed whenever they can spare the time.

Ohio

The city of Cleveland has now almost completed a campaign of tree planting which will add 2,000 trees to the 150,000 which help to make Cleveland the Forest City.

City Forester Rettig's chief work has been ridding the city streets of the poplars.

Every opportunity has been seized to destroy them and replace them with elms, maples or sycamores. The 2,000 trees planted this fall and winter take the place of the poplar.

Forester Rettig's conservation plans include the adoption of some of the forestry methods in use in Germany and England. With these methods Cleveland could have trees even where grass and good soil are now unknown, Rettig says.

"They take care of their trees in European cities," said Rettig. "We are doing all we can here, but they are ahead of us in some things, especially in planting. We are as far in advance in Cleveland in spraying and otherwise treating trees as they are in Europe."

The local forestry department bought trees for the first time this fall by competitive bidding. The result was a better class of young trees at a cheaper price. The 2,000 now being planted cost the city from 75 cents to \$1 apiece.

Forester Rettig looks for Cleveland to retain her title of the Forest City despite the continued growth of industries and the consequent smoke-laden air so harmful to tree life.

NEWS AND NOTES

Instruction in Forestry

The recently established department of forestry in the New York State College of Agriculture at Cornell University is finding that forestry is a subject of genuine interest to the students of the university. The department will now be able to increase the scope of its work because of the addition of an assistant professor to the staff. Mr. John Bentley, Jr., a graduate of the Yale Forest School in the class of 1907, and at present in charge of the planting in District 2 of the United States Forest Service, has been appointed to the assistant professorship, and will enter on his new duties on January first. The department is ready to supply a lecture on forestry to meetings of any kind in New York State.

Canada's Forestry Problem

Speaking of the need of arousing pressing interest in the reforestation of hard wood areas in Eastern Canada, H. R. MacMillan, in *The Canadian Century*, says: "There are two points to be made; first, that the supply of wood suitable for manufacturing purposes in Eastern Canada is practically exhausted; the other, that large Canadian industries, dependent upon valuable hard woods, are forced to import their raw material from the United States at high prices, and are, therefore, at a disadvantage in competing with United States manufacturers. The remedy for the manufacturer lies, not in using less wood, but in using his influence to see that cities, counties or provinces take steps to reforest with valuable woods the many areas of waste land, now lying unproductive, which may be found in every county in Eastern Canada. The German cities own forests, the municipalities corresponding to counties and provinces in Switzerland and France own forests, managing them for the production of timber for industrial purposes, and for revenue. Several of the Eastern States—New York, Vermont, New Hampshire, Connecticut, Massachusetts, Pennsylvania, and New Jersey—have purchased waste land for reforestation. Finding that work was not proceeding rapidly enough, and that the administration of these hard wood lands could be better managed by the Federal Government than through several State Governments, Congress has appropriated for the purchase of lands in the Eastern States, to be managed by the Forest Service as a perpetual source of high grade hard wood timber. The appropriation of this money was secured largely through the support of manufacturers.

"There is no record that, with the exception of the Canadian Pacific Railway Company, any private corporations in Canada have undertaken to grow on their own lands the timber they will require. The Canadian Pacific Railway Company employs several trained foresters, and is at present making an examination of its timber lands in British Columbia with the idea of managing them for the perpetual production of ties and other construction material."

Some Plain Facts

Prof. Hugo Winkenwerder, of the University of Washington, in a recent talk on the present status and future problems of forestry gave some plain facts and statistics of particular interest to any new student of forestry. He said: "There are problems of great economic and national importance which can only be solved by forestry.

"Our national idea of forestry did not take root until 1891 when Congress authorized the President to set apart forest reserves. We have now 150 national forests, which embrace 195 million acres. Twelve states have adopted the policy of owning forests within the State. A score of universities and colleges are offering courses in forestry.

"The practice of forestry in the United States as yet consists of little more than fire protection. It is important that we have reproduction, rapid growth and a large yield."

The means employed to prevent fires Professor Winkenwerder said, were broad trails free of inflammable materials, telephones installed and fire patrols.

"The forests of the United States average only 12 cubic feet growth per acre per year. The forests of Europe average 36 feet per year. It has been estimated that about 80 per cent of our forests are only half stocked with trees.

"A great many of our forests are over mature and ought to be cut out. A great part of the forest area has lost its fertility, because the water has washed off the fertile soil or the sun has dried up the soil."

Reforestation Legislation

State Senator George F. Argetsinger, of New York State, with a view for providing forest revenues for future generations has prepared a bill which he will introduce early in January which will encourage farmers to plant trees on land that is not tillable. Senator Argetsinger has found that there is considerable such land on a large number

of farms in the State, and he knows of no better purpose to which it could be put.

"What I want to do is to work out some plan to make it an object to the farmer to plant land with trees," says Senator Arget-singer. "I believe that if the tax on land planted to trees was made nominal and not the same as the rate on the rest of the farm property, the growing of trees would be greatly encouraged. My plan is to have the farmer report to the State Conservation Commission that he has a certain number of acres of land devoted to raising trees, the kind of trees he is growing and their condition. On the recommendation of the commission this land might be exempted by the assessors from the regular rate of taxation and a nominal rate charged. It is my suggestion that this exemption be made for a period of 30 years."

Watershed Protection

Secretary Wilson has decided that the interests of cities and towns which obtain their water from streams having their watersheds within National Forests call for special measures of protection, and he has therefore developed a plan of cooperation for the Department of Agriculture with those communities which are alive to the importance of keeping their water supply pure.

One of the recognized objects of forestry is to insure the permanence and protect the purity of municipal water supplies. As the Forests are maintained for the benefit of the public, Secretary Wilson considers it the duty of his Department to do all that it can both to prevent the pollution of such supplies and to create or maintain conditions most favorable to a constant flow of clear water. By protecting and improving the forest cover and by enforcing special regulations to minimize erosion and to provide for the maintenance of sanitary conditions, the Government will try to safeguard the interests of the public.

A form of agreement has been drawn up, providing that, when cooperation is entered into between the Secretary of Agriculture and any city desiring conservation and protection of its water supply, the Secretary will not permit the use of the land involved without approval by the town or city, except for the protection and care of the Forests, marking, cutting, and disposing of timber which the Forest officers find may be removed without injury to the water supply of the city, or for the building of roads, trails, telephone lines, etc., not inconsistent with the objects of the agreement, or for rights of way acquired under acts of Congress. The Secretary also agrees to require all persons employed on or occupying any of the land both to comply with the regulations governing National Forests and to observe all sanitary regulations which the city may propose and the Secretary approve.

The agreement provides for the extension and improvement of the Forests on the part

of the Government by seeding and planting and the best methods of silviculture and forest management, so far as the funds available will permit. The city on its side is expected to assist in the work by paying the salaries of the additional guards necessary to carry out the agreement, and in case extensive forest operations are immediately desired by the city, it would bear the major part of the cost entailed by this work.

Secured 20,000 Acres

Pennsylvania a few days ago took title to 20,000 acres of forest land in the Cumberland Valley for addition to its forest reserves, the purchase having been consummated by Commissioner of Forestry Robert S. Conklin after a long negotiation with the South Mountain Mining and Iron Company. The tract, which is known as Pine Grove furnace, is one of the old time iron manufacturing properties, the land having supplied the wood for the charcoal furnaces which made the iron in Pennsylvania seventy-five years ago.

The purchase, which is the largest single acquisition made by the department for several years, increases the area of the State forest reserves in the Cumberland Valley to 100,000 acres and makes the total extent of the reserves in the State 985,000 acres.

The land lies in Cumberland and Adams counties and adjoins the Caledonia furnace tract, formerly owned by Thaddeus Stevens and the Mont Alto furnace tract, which are now State property. It is covered with oak, chestnut, pine, poplar and hemlock and in addition to having a fine growth of timber contains iron ore, clay and sand baks and water and ice leases from all of which the State will derive an income.

City Owns Tree Farm

It is not generally known that the city of Columbus, Ohio owns and operates a tree farm, says the *Columbia Dispatch*. Such is the case, however, and it was planted and is managed by James Underwood, superintendent of Franklin Park and head of the city forestry department.

Several acres of ground surrounding the water purification plant and owned by the city, were planted with trees some time ago as an experiment, and many of them will be ready for replanting next fall. On the tract there are 1,000 elms, 1,000 Norway maples and about 6,000 different varieties of shrubs. The trees and shrubs will be used for replanting in the city parks, and later, as the supply of trees increases, they will be used in street planting.

The success the department has had so far in the growing of tree plants has encouraged it to plant for more extensive operations along this line. It is possible that part of the city land on either side of the Scioto River, north of the dam, will be utilized in this manner in the future, and that a systematic planting of trees along sidewalks will be taken up.

The forestry department has employed from six to ten expert tree-trimmers during the fall months, in trimming trees along the sidewalks, free of charge to the property owners. The territory extending from High to Parsons Avenue and from Naghten to Deshler, was covered. About 8,000 trees were trimmed, 400 dead ones removed and about 700 wagon loads of trimmings and dead trees hauled away. It is expected that the work will be continued in the early spring.

New England Trees in Winter

Prof. Albert F. Blakeslee, of the Department of Botany in the Connecticut Agriculture College, together with C. D. Jarvis, has just issued an extensive and profusely illustrated bulletin on New England Trees in Winter. In the preface the bulletin says: "At present there is no general work upon American trees which combines illustrations of the individual forms with keys for their identification based upon winter characters. The forester and lumberman, however, are more called upon to distinguish trees in winter when leaves and flowers are fallen than in summer. Trees, as the most conspicuous elements in the winter landscape, must also appeal to the student of out door life. The interest shown by classes of school teachers in the Summer School in identifying specimens of twigs collected the previous winter indicated that the winter study of trees can be taken up with enthusiasm by teachers in their schools. In our experience, the winter identification of trees has proven to students one of the most interesting subjects of their course. It is of decided value for its training in the power of accurate observation. The work comes at a time when material for natural history study seems scanty and might therefore be used to bridge over the period between fall and spring which are unfortunately considered by many the only seasons when study of out door life is possible in the schools. A tree in winter is far from being the characterless object many believe. Freed from its covering of leaves, the skeleton of the tree is revealed and with the method of branching thus clearly discernible, the species may generally be more readily identified at a distance than in its summer garb. There are many forms, moreover, that are difficult to distinguish from summer features alone but which in winter have twig, bud or other characters which make their separation comparatively easy."

A co-operative agreement entered into between the U. S. Department of Agriculture and the State of Maryland provides for an expenditure by the Government of not to exceed \$600 during the year ending December

31, 1911, this sum to go toward meeting the expenses of forest fire protection in Maryland. The areas to be protected are in Allegheny, Garrett, Washington, and Frederick counties. The co-operative agreement is made possible by the terms of the Weeks Law, which Congress passed last winter.

The funds of the Federal Government will be used solely for paying patrolmen. The State officials select these patrolmen, subject to the approval of the Department of Agriculture. The maps submitted to the Federal Government show where each of these patrolmen will be located, the approximate routes of patrol, and all matters necessary to a clear understanding of the State's plan of fire control, including the location of lookout points, telephone communications, railroad patrols, location of State forest fire wardens and other officials, and the like.

Mr. J. J. Levison, Arboriculturist for the Boroughs of Brooklyn and Queens, New York City, has recently been appointed as special lecturer at the Yale Forest School on the planting and care of street and park trees. His course of ten lectures, which form part of the work in the fall term, covers a wide and varied field. It is the first time such a course has been given in any of our forest schools; it is a needed course and several of the Yale graduates have already been placed in charge of city tree work in New Haven, Conn., and Milwaukee, Wis. Other big cities are seeking professionally trained foresters, and the prospects are that the demand for especially equipped men is on the increase.

Lyford, Clark & Lyford, Forest Engineers, is the new name under which the well-known Montreal firm of C. A. Lyford & Co. is now doing business. The members of this firm are: Judson F. Clark, C. A. Lyford, and P. L. Lyford. Mr. Clark and C. A. Lyford are also members of the firm of Clark & Lyford, Forest Engineers, of Vancouver. These two firms are at present conducting forest surveys aggregating over 500,000 acres. They report a rapidly increasing demand for their services.

For national forests in the Appalachian and White mountains, Secretary Wilson says no lands will be recommended for purchase on which options have been obtained for the purpose of selling to the government at a profit.

The Weeks law provided \$2,000,000 a year until 1915 for the purchase of Appalachian and White mountain timber lands. More than 1,800,000 acres have been offered, of which more than 400,000 have been examined and agreements have been reached with owners of 100,000 acres.

A. F. Hawes, of Burlington, Vt., state forester, has recommended to the city council the reforestation of the land around Berlin pond owned by the city, some sixty or seventy acres, to protect the water supply, and he expects that in years to come it will be a good investment on the part of the city. He recommends the planting of pine and spruce. The state will furnish the seedlings at actual cost, also plant them at cost. The trees cost about \$5 a thousand, and the expense of planting is about \$10 an acre.

Rivers and Harbors Congress

Over a thousand delegates of the National Rivers and Harbors Congress met in Washington, for several days early in December, and after hearing many enlightening discussions and several excellent papers adopted a series of resolutions. The resolutions, which were presented to the President and also to the House and Senate, urged the adoption by the Government of a board, liberal, comprehensive, systematic, and continuous policy of waterway improvement, and the continuance by Congress of the policy of annual appropriations for rivers and harbors and connected waterways.

The resolutions also urge that such waterway improvements as have been recommended by the Government engineers and approved by Congress should be completed rapidly as possible. The congress also, in a resolution, stated that the minimum annual appropriation required to carry forward waterway improvements on a scale commensurate with the importance of the work to be done is \$50,000,000.

The congress also recommended the enlargement of the powers of the Interstate Commerce Commission to the end that the the Commission may more effectually regulate competing land and water carriers, and provide for the interchange of traffic.

Canadian Forestry Convention

Last year the Canadian Forestry Convention was held in the old Rock City of Quebec. This year, under the patronage of His Royal Highness, the Duke of Connaught, Governor General of Canada, it meets on Feb. 7 and 8, in the Parliament Buildings at Ottawa, the capital city of the Dominion.

This will be a particularly important meeting. There are a number of subjects pressing for solution, the Parliament will be in session and the Canadian Lumbermen's Association will be meeting in Ottawa at the same time. It is expected that the meeting will be addressed by Hon. R. L. Borden, Premier of Canada, Sir Wilfred Laurier, leader of the Opposition, Mr. Gifford Pinchot of Washington, Mr. H. S. Graves, United States Forester, and others.

The Canadian railways have granted single fare round trip rates to Ottawa. On Wednesday evening, Feb. 7, there will be a banquet participated in by the Lumbermen's Association as well as the Forestry Association.

The Ottawa winter season will be in full swing, and visitors from a distance will find much to interest them in the Canadian capital.

Further particulars may be obtained by writing to Mr. James Lawler, Secretary, Canadian Forestry Association, Canadian Building, Ottawa, Canada.

Popular Interest in Forestry

The general increase in popular interest in the work of the forester which is steadily attracting more attention in the newspapers is added too by the following article from a recent issue of the *New York Sun*:

"Forestry as a profession has been practised in this country for only about fifteen or twenty years. Within that period, however, it has advanced greatly and it has now come to be a business as well as a profession. It has many practitioners and there are also now engaged in it concerns that will undertake any kind of forestry work, from the treatment of a single tree to the care, development and protection of extensive forest tracts.

"In the offices of such concerns it is a common thing nowadays to receive from suburban or country residents who may own perhaps a single noble tree or a clump of trees that seem not to be thriving a request to look them over. Whereupon the concern sends out a tree doctor, an expert forester, who inspects these trees, root, trunk and branch, for cavities, for insect borers, for the detection of scale, the removal of dead wood and the most advantageous pruning of the live wood, for the bolting or chaining of limbs if that should be necessary, for whatever may be needed to restore the trees to or to preserve them in sound health and their normal beauty.

"On the results of this inspection the forestry concern makes to the owner a typewritten report, and then it remains with the owner to determine what he will have done. There are owners who have their trees inspected at regular intervals as a preventive and preservative measure to keep the trees in health.

"For owners of more extensive country estates which may include within their territory stretches of woodland the modern forester does many things. Here he not only cares for individual trees, but he is as well a landscape forester. He will clear away underbrush and without destroying their woody flavor make woods accessible so that they may be enjoyed; and by the judicious removal of branches or the cutting out of a tree or two he may reveal a beautiful view."

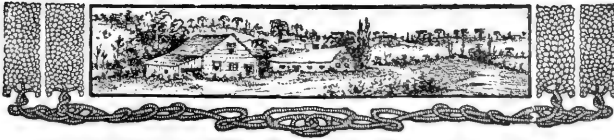
THE ANNUAL MEETING

THE thirty-first annual meeting of the American Forestry Association will be held in Washington on Tuesday, January 9. There will be three sessions.

At ten in the morning the directors will meet at the New Willard, for the transaction of general business.

At one in the afternoon there will be a luncheon at the New Willard for the ladies and gentlemen of the Association. At this luncheon, the cost of which will be \$2.00 a plate, there will be addresses by Governor Robt. P. Bass, of New Hampshire, the President of the Association, Henry S. Graves, of the United States Forest Service, and Thomas Nelson Page. The election of officers will follow.

In the evening at 8:30 there will be a smoker at the Commercial Club attended by the members of the Association and to which prominent men of various departments of the Government will be invited. There will be a number of short addresses and discussions on forestry and conservation work.



FOREST FIRES

Fire in California

A report from San Diego, Cal., dated Nov. 29, says: "Brush fires that started early yesterday morning in the Cleveland Forest Reserve and in many places in the country east and south of San Diego are today sweeping over large areas of unimproved land. In Lower California reports from points along the border that have telephone communication with San Diego and from boats recently arrived from Ensenada are that fires are prevailing in many ranges on both sides of the peninsula.

"In San Diego county fires are raging on San Miguel Mountain, Volcano Mountain, Cuyamaca, Upper Otoy, Sweetwater and Green Valleys, Lost Pine Mountains, Potrero, Treate, Campo, Black Mountain, San Dieguito River Valley and Viejas Mountain. In the Lost Pine Mountains the hoisting machinery and sheds of a mine were destroyed.

"No estimate of the damage in the fire zone has been obtained. Forest Supervisor H. N. Wholer, of the Cleveland Reserve, has every man in his employ out; the county rangers have also been pressed into service and the men employed on the big ranches in the district in question are aiding. It is hoped by tomorrow at the latest, if the winds subside, to check the flames."

Washington's Fire Losses

Eleven million feet of timber was destroyed and over 70,000,000 feet was killed by fire in the State of Washington during the summer of 1911, according to the report of J. R. Welty, Washington State fire warden, just filed with the State board of forest commissioners. Most of the killed timber is accessible and many be logged, thus causing little loss, says Mr. Welty.

During the season fires burned over a total of 86,364 acres. A total of 5,792 permits to burn slashings were issued by the fire warden and his deputies. Fifty-four arrests were made for violation of the forestry laws, and the fines and costs in connection with these arrests totaled \$1,291.05. Forty-eight out of the 54 arrests made resulted in convictions.

"Burning under permits," says the report, "was attended by little loss. The holders of permits generally exercised great care to prevent the fires from spreading beyond the limits of the slashings. About 46,000 acres of slashings were burned under permits during the season, indicating that much land is being cleared for agriculture.

"The total area burned over by these fires was 86,364 acres, as follows: Cutover or logged-off lands, 62,669 acres; old burned tracts, most of which were burned over in fires of 1902, 18,530 acres; second-growth timber, not yet merchantable, 889 acres; merchantable timber, 4,267 acres.

"Of this 4,267 acres of merchantable timber burned over 1,947 acres were killed or destroyed and 2,329 acres were not injured.

"Where second-growth timber, not yet merchantable, standing on ground suitable for timber growth only is burned, the loss is serious, but where such timber is located on land suitable for agriculture and which will in the near future be used for that purpose, the loss is light.

"Most of the second-growth timber land reported as burned over is suitable for agriculture."

The total logged-off lands burned over amounted to 62,669 acres. Of this area nearly one-sixth is in Thurston County.

In the destruction of merchantable timber Lewis County suffered the greatest loss. The total amount destroyed was 7,000,000 and the total killed 65,000,000 feet. In Cowlitz County 1,000 feet of timber was destroyed and 1,250 feet killed. In Snohomish County 1,000,000 feet was killed by fires and 450,000 feet destroyed. Pierce County lost 265,000 feet of merchantable timber, and timber measuring 250,000 feet was killed. Clarke, Perry, Jefferson, Kitsap, Klickitat, Pend, Oreille, Whatcom and Spokane counties suffered no loss.

Reducing Fire Fighting Cost

Considering the efficiency of the service obtained, Montana's fire fighting bill for the past season, under the cooperative plan inaugurated last spring, was merely nominal, according to a report submitted to the State Board of Examiners by State Forester Charles W. Jungberg.

The State has two co-operative agreements, one with the private lumber companies and the government on a pro rata acreage basis, and the other with the government alone. Under the first agreement, Montana is a member of the Northern Montana Forestry Association, operating in Flathead and Lincoln counties.

The total fire loss in this district on 194,428 acres of timber, valued approximately at four million dollars was only \$35. The cost to the State protecting its 68,721 acres in the district, valued at \$1,356,963, was but \$343.61. In the district there were six fires during the season and a total of 199 acres were

burned over, damaging 25,000 feet of timber, valued at \$35. The assessment this year was only half a cent an acre.

"The State is willing to co-operate and pay its pro rate on an acreage basis in districts where the owners of private timber lands are willing to co-operate," says Mr. Jungberg in his report. "The Northern Montana Forestry Association has a membership numbering 84, which includes all the large lumber companies and individuals holding tracts of timber in that district. While the Anaconda Copper Mining Company is not included in the Northern Montana Forestry Association, yet it has had men to patrol the country in and adjoining this district this season, and

has shown a disposition to fight fires if necessary. Fire hazard in this district is very great, owing to the large amount of timber cut during the last twelve years, and to the fact that two railroad lines tap this district in various places.

"The cost of fighting fires in three other districts is on a percentage basis, the Government paying sixty-five per cent of the cost of fighting all fires that occur, and the State thirty-five per cent. This percentage agreement covers three districts. In district number one are 180,800 acres; in district number two 483,840 acres, and in district number three 299,520 acres, a total of 964,160 acres.

CURRENT LITERATURE

MONTHLY LIST FOR DECEMBER, 1911

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Encyclopedias, dictionaries and calendars

Caccia, A. M. and Troup, R. S. A glossary of technical terms for use in Indian forestry. 58 p. Calcutta, 1911. (India—Forest dept. Forest bulletin, new series, No. 4.)

Forest History

Fernow, Bernhard E. A brief history of forestry in Europe, the United States and other countries. Rev. and enl. ed. 506 p. Toronto, University press, 1911.

Forest Aesthetics

Street and park trees

Buffalo, N. Y.—Park commissioners. Forty-second annual report, 1910-11. 46 p. Buffalo, N. Y., 1911.

Forest Education

Forest schools

University of Michigan—Dept. of literature, science and the arts. Announcement of the course in forestry, 1911-1912. 23 p. Ann Arbor, Mich., 1911.

University of Minnesota—College of agriculture, including college of forestry. Announcement, 1911-1912. 89 p. Minneapolis, Minn., 1911.

Yale forest school. Prospectus, 1911-1912. 28 p. New Haven, Conn., 1911.

Forest Description

Langille, H. D. Report on timber and grazing proposition in Chili, South America. 49 p. Chicago, etc., n. d.

Peavy, George W. The forests of Oregon; their importance to the state. 23 p. il. Salem, Ore., 1911. (Oregon—State board of forestry. Bulletin No. 1.)

Forest Botany

Trees: classification and description

Blakeslee, A. F., and Jarvis, C. D. New England trees in winter. 576 p. il. Storrs, Conn., 1911. (Storrs agricultural experiment station. Bulletin 69.)

Maiden, J. H. The forest flora of New South Wales, pts. 44-5. 35 p. pl. Sydney, Govt. printer, 1911.

Woods: classification and structure

Sudworth, Geo. B., and Mell, Clayton D. The identification of important North American oak woods, based on a study of the anatomy of the secondary wood. 56 p. il. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Bulletin 102.)

Arboretums

Arnold arboretum. Bulletin of popular information, No. 17. 7 p. Jamaica Plain, Mass., 1911.

Silvics*Forest influences*

Munger, Thornton T. Avalanches and forest cover in the northern Cascades. 12 p. pl., map. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Circular 173.)

Ecology.

Harper, Roland M. The Hempstead plains; a natural prairie on Long Island. 10 p. il. N. Y., American geographical society, 1911.

Harper, Roland M. The relation of climax vegetation to islands and peninsulas. 11 p. N. Y., Torrey botanical club, 1911.

Harper, Roland M. The river-bank vegetation of the lower Apalachicola, and a new principle illustrated thereby. 10 p. il. N. Y., Torrey botanical club, 1911.

Studies of species

Woolsey, Theodore S. Western yellow pine in Arizona and New Mexico. 64 p. il., pl. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Bulletin 101.)

Silviculture*Natural reproduction*

Swain, E. H. F. Reafforestation and the hardwood supply in relation to North Coast forests. 8 p. Sydney, Govt. printer, 1911.

Planting

Cox, Wm. T. Reforestation on the national forests; pt. 1—Collection of seed; pt. 2—Direct seeding. 57 p. il., pl. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Bulletin 98.)

Secrest, Edmund. Treatment of artificial tree plantations. 21 p. il. Wooster, O., 1911. (Ohio—Agricultural experiment station. Circular 110.)

National business league of America. The tree planters of America, a potent factor for the reforestation of the United States and extension of practical arboriculture by the American farmer boys. 3d ed. 39 p. Chicago, 1911.

Forest Protection*Insects*

Burgess, A. F. *Calosoma sycophanta*; its life history, behavior, and successful colonization in New England. 94 p. il. pl., map. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Bureau of entomology. Bulletin 101.)

Stebbing, E. P. On the life-history of *Chermes himalayensis* on the spruce, *Picea morinda*, and silver fir, *Abies web-biana*. 26 p. il., pl. London, 1910. (Linnean society of London. Transactions, 2d ser. zoology, v. 11, pt. 6.)

Forest Economics*Statistics*

MacMillan, H. R. and Boyce, W. Guy H. Forest products of Canada, 1910: cross ties purchased. 7 p. Ottawa, 1911. (Canada—Department of the interior—Forestry branch. Bulletin 22.)

MacMillan, H. R. and Boyce, W. Guy H. Forest products of Canada, 1910: poles purchased. 8 p. Ottawa, 1911. (Canada—Department of the interior—Forestry branch. Bulletin 21.)

MacMillan, H. R. and others. Forest products of Canada, 1910: timber used in mining operations. 12 p. Ottawa, 1911. (Canada—Department of the interior—Forestry branch. Bulletin 23.)

Forest Administration

Dutch East Indies—Dienst van het boschwezen. Verslag over het jaar 1910. 118 p. pl. Weltevreden, F. B. Smits, 1911.

India—Bombay presidency—Forest department. Administration report of the forest circles in the Bombay presidency, including Sind, for the year 1909-1910. 166 p. Bombay, 1911.

India—Central provinces—Forest dept. Report on forest administration for the year 1909-10. 138 p. Nagpur, 1911.

United States—Dept. of agriculture—Forest service. The national forest manual; instructions to forest officers relating to forest plans, forest extension, forest investigations, libraries, coöperation, and dendrology. 45 p. Wash., D. C., 1911.

United States—Dept. of agriculture—Forest service. The national forest manual; timber sales, administrative use, timber settlement, free use. 90 p. Wash., D. C., 1911.

National and state forests

Burns, Findley. The Crater national forest; its resources and their conservation. 20 p. pl., map. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Bulletin 100.)

Forest Utilization

Lumber industry

Hatch, Charles F. Manufacture and utilization of hickory, 1911. 16 p. Wash., D. C., 1911. (U. S.—Department of agriculture—Forest service. Circular 187.)

United States—Dept. of agriculture—Forest service. Record of wholesale prices of lumber based on actual sales made F. O. B. mill for July, August and September, 1911. 15 p. Wash., D. C., 1911.

Wood preservation

Bateman, E. Modification of the sulphonation test for creosote. 7 p. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Circular 191.)

Weiss, Howard F. and Barnum, Chas. T. The prevention of sap stain in lumber. 19 p. il. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Forest service. Circular 192.)

Auxiliary Subjects

Botany

Hole, R. S. On some Indian forest grasses—their ecology. 126 p. pl., map. Calcutta, Supt. govt. printing, 1911. (Indian forest memoirs, Forest botany series, v. 1, pt. 1.)

Horticulture

Bailey, Liberty Hyde. Farm and garden rule book. 587 p. il., New York, The Macmillan Co., 1911.

Periodical Articles

General

Agricultural journal of the Union of South Africa, Oct. 1911.—The forest red-gum, by J. Burt-Davy, p. 472-5.

Country life in America, Dec. 1, 1911.—Mistletoe as a forest pest, by J. L. Cowan, p. 78-82.

Forest and stream, Dec. 9, 1911.—Pinchot on the Adirondack problem, by G. Pinchot, p. 837-9, 856.

Garden magazine, Dec. 1911.—Moving big trees in winter, by W. C. McCollom, p. 217-19.

National geographic magazine, Nov. 1911.—The kingdom of flowers; an account of the wealth of trees and shrubs of China and of what the Arnold arboretum, with China's help, is doing to enrich America, p. 1003-35.

Popular science monthly, Dec. 1911.—The water relations of desert plants, by D. T. MacDougal, p. 540-53.

Science, Nov. 24, 1911.—Additional facts about the chestnut blight, by I. C. Williams, p. 704-5.

Trade journals and consular reports

American lumberman, Nov. 18, 1911.—Curious trees; the banyan, p. 31.

American lumberman, Nov. 25, 1911.—The problem of wood utilization, p. 36-7; Prevention of forest fires, by C. W. Ward, p. 48-9.

American lumberman, Dec. 2, 1911.—Manufacturing alcohol from refuse wood, p. 42 A; Timber in Rocky Mt. national forests, p. 42 B-C; Scientific management in the woods, by E. A. Braniff, p. 50.

American lumberman, Dec. 9, 1911.—Forestry students in practical work, p. 39; The problem of wood utilization, p. 42-42A. Engineering news, Oct. 5, 1911.—A pole-preserving machine, p. 414-15.

Engineering news, Oct. 19, 1911.—Machines for boring and trimming ties and driving screw spikes, p. 458-62; Wood pavement specifications at Vancouver, B. C., p. 475.

Hardwood record, Nov. 25, 1911.—Steel vs. wooden railroad cars, p. 27-8; Hardwood flooring, p. 31-2.

Lumber review, Nov. 15, 1911.—Wood block pavement best, by W. F. Carns, p. 34, 38; Seasoning wood by electricity, p. 41.

Lumberman's review, Nov. 1911.—Making forestry pay; Mr. Slaymaker applies protective and forest reproduction methods to his forest areas in West Virginia, by S. E. Slaymaker, p. 16.

Paper mill and wood pulp news, Nov. 18, 1911.—Testing woods; the work being done at government pulp wood station at Wausau, Wis., p. 3.

Paper trade journal, Nov. 23, 1911.—Empire state forest products association; 6th annual meeting and banquet at Watertown, p. 34-5.

Pulp and paper magazine of Canada, Nov. 1911.—The wood supply of Europe, p. 394-7.

St. Louis lumberman, Nov. 15, 1911.—What is conservation, by J. B. White, p. 62.

Timberman, Nov. 1911.—A log lowering device, p. 44; Operations of an electric logging donkey demonstrated at Coos Bay, p. 47; Methods employed in reforestation on Siuslaw national forest, by F. S. Allen, p. 50.

United States daily consular report, Dec. 9, 1911.—Lumber and its products, by E. H. L. Mummenhoff and others, p. 1233-46.

United States daily consular report, Dec. 13, 1911.—Canada's lumber production, by F. M. Ryder, p. 1316-17.

Wood craft, Dec. 1911.—Characteristics employed in the identifying of wood, by C. D. Mell, p. 67-8; The best woods for the carver's use, by T. A. Tefft, p. 84-5; Kiln-drying of lumber in England, p. 85-6.

Wood-worker, Nov. 1911.—Drying and handling factory lumber, by C. D. Gifford, p. 39-40.

Forest journals

Allgemeine forst- und jagd-zeitung, Oct. 1911.—Umriss eines systems der forstlichen Verrechnung, by Katzer, p. 321-32; Ein neuer stockheber nach dem system der Heblade, p. 359.

Allgemeine forst- und jagd-zeitung, Nov. 1911.—Die gegen einige unserer forstwirtschaftlichen massnahmen in ästhetischer beziehung von naturfreunden erhobenen bedenken und deren forstliche würdigung, by Tiemann, p. 361-71; Diskussion der forststatistischen gleichungen, by T. Glaser, p. 371-83.

Bulletin de la Société centrale forestière de Belgique, Nov. 1911.—Note sur la fumur des oseraies, by J. Huberty, p. 697-702; Le liquidambar ou copalme d'Amérique, by N. I. Crahay, p. 732-4.

Canadian forestry journal, Sept.-Oct. 1911.—The Turtle Mt. forest reserve, p. 118-22; Le traitement préservatif des traverses de chemin de fer, p. 127-30; Planting trees, by P. McArthur, p. 130-1, 138; Saxony's forest practice, by H. L. Sullivan and E. F. Jennings, p. 132-4.

Centralblatt für das gesamte forstwesen, Aug.-Sept., 1911.—Graphisches rechnen in der waldwertrechnung, by E. Roubiczek, p. 345-61; Die volkswirtschaftliche bedeutung der wildbachverbauung in Galizien, by S. Kruk, p. 361-70; Über den einfluss fehlerhafter bestimmungen der dimensionen auf den inhalt von rundholz, by A. Schiffel, p. 371-90; Tätigkeitsbericht der Karst-aufforstungskommis-

sion für die gefürstete grafschaft Görz und Gradiska für das jahr, 1910, p. 415-20; Die periodischen vegetationserscheinungen in ihren beziehungen zu den klimatischen variationen, by E. Vanderlinden, p. 420-2.

Centralblatt für das gesamte forstwesen, Oct. 1911.—Über hiebssatzermittlung, by E. Roubiczek, p. 429-36; Forstmathematische miszellen, by G. Merker, p. 437-40; Zur fehlerregelung der klüppierung, by A. Szabó von Bágyon, p. 441-7; Studien über das bondenbesserungsvermögen unserer wichtigsten holzarten, by R. Wallenböck, p. 447-58.

Forstwissenschaftliches centralblatt, Oct. 1911.—Starkholzzucht im lightwuchsbetrieb, by Frey, p. 517-23; Die beleihung von waldungen, by O. Tafel, p. 523-35; Die forstaustellung zu Landau (Pfalz) im Mai, 1911, by Künkele, p. 542-53.

Forstwissenschaftliches centralblatt, Nov. 1911.—Ein maikäferkrieg, by Puster, p. 577-86; Jährliche erzeugung wertvollsten holzzuwachses auf kleinster fläche, by von Fürst, p. 586-90.

Indian forest records, Sept. 1911.—A note on some statistical and other information regarding the teak forests of Burma, by R. S. Troup, p. 1-73.

Indian forester, Nov. 1911.—Forest research in India, p. 595-605; Bamboo pulp as the paper material of the future, by H. Vincent, p. 627-30; Trees and moisture; a great experiment being carried on at Wagon Wheel Gap, Colo., p. 630-3.

North woods, Nov. 1911.—Work of Minnesota forest service, p. 12-14; Slash burning, by W. T. Cox, p. 15-16.

Revue des eaux et forêts, Nov. 1, 1911.—Le mouvement forestier à l'étranger; Suisse, by G. Huffel, p. 659-63.

Zeitschrift für forst- und jagdwesen, Oct. 1911.—Plenterbetrieb oder hochwaldbetrieb, by Fricke, p. 737-46; Die zeitlich verschiedene nährstoffaufnahme der waldbäume und ihre praktische bedeutung für düngung und waldbau, by E. Ramann, p. 747-57.

“This American Forestry Association is your association, and if you want to make it the force it should be throughout the land it depends on you. You are not good members if you do not go home and get a half dozen new members. What is the use of talk without work, what is the use of belonging to this association unless you do something? Go home with the resolution in your hearts to uphold your officers and the Association as only American men and American women can.” ∴

Charles Lathrop Pack, in address at the
annual meeting.



GOV. ROBERT P. BASS, OF NEW HAMPSHIRE, PRESIDENT OF
THE AMERICAN FORESTRY ASSOCIATION.

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THE PROGRESS OF FORESTRY*

BY HON. ROBT. P. BASS
GOVERNOR OF NEW HAMPSHIRE

IT is a source of deep satisfaction for us to contemplate the large acreage of forest lands that have passed into public ownership and management in this country since the forestry movement started. The forest reserves which were created in 1891, and later more appropriately named "National Forests," have been increased in area and now include about 190,000,000 acres. Many state forest reservations have been created, established, so that at the present time about one-fifth of the forest area in the country is owned by the public. To this extent at least has a system of management looking toward the protection, improvement and wise use of our timber supply present and future been insured for the benefit of all the people. It is particularly gratifying to note the growth in technical efficiency by which we are rapidly realizing the best ideals in the management of these public forests.

The states are also coming to the front, recognizing their duties in providing efficient fire protection, aiding private owners in reforesting waste lands and in educating the public in the best methods of handling timber lands. There are now *twenty-three* states that maintain active departments of forestry. Of these *twelve* employ technical foresters in charge of all state forestry activities.

While we are rejoicing in the changed attitude of the public mind toward forestry, let us continue to exert our influence to maintain and steadily improve public forest policies. Above all, let us recognize that a great field of usefulness awaits our efforts in bringing about a more economic management of private forests. At present about four-fifths of the timberlands of the country are in private hands and it is our earnest desire to see as great progress in this field during the next decade as the past decade has witnessed in public forestry.

The total timber cut of the country in 1900 was 35 billion feet, in 1905 37½ billion, and 1909 44½ billion. The enormous increase shown by these figures

*Address of Hon. Robt. P. Bass, President of the American Forestry Association, at the annual meeting in Washington, D. C., on Jan. 9, 1912.

demonstrates beyond question the importance of extending the practice of forestry to commercial lumbering operations.

In order to achieve this end, it is necessary that all of the different forces pursue their work in the closest harmony. The results already accomplished seem wonderful when we realize that until very recently the different private owners, the states and the federal government have been working almost independently of each other. During the past year or so the idea of co-operation has gained headway rapidly. Especially significant is the co-operation among timberland owners for protection against their common enemy, fire.

To the Pacific Northwest belongs the credit for the first large timber owners' protective associations. There are a number of such in the north-western states, most of them belonging to a central organization, the Western Forestry and Conservation Association. The general method pursued is to assess the individual owners on an acreage basis, the funds being expended for fire fighting, the employment of patrolmen and for educational purposes. The strongest test of the efficiency of co-operative fire protection came soon after these associations were formed, when the northwest experienced the most dangerous fire season in its history. While the loss was heavy for the region as a whole, only about $1\frac{1}{2}$ of 1% of the timber in the associations was destroyed.

The first association of this kind in the East was formed in New Hampshire in 1910. It represents an ownership of 1,200,000 acres and, during the recent summer of severe drought, proved the efficiency of such co-operation. An association has also been formed in the Lake States, representing an ownership of 2,000,000 acres. It is interesting to note that these associations now represent over 14,000,000 acres and that they offered protection to as much more contiguous territory not represented in the associations.

THE NEED OF CO-OPERATION

These examples of the benefit derived from private co-operation indicate the larger benefits which will result from full co-operation between the Federal government, the state and local government and private owners.

For the promotion of such co-operation there is no better practical instrument at hand than Section 2 of the Weeks Act, which appropriates \$200,000 to enable the Forest Service to co-operate with states in protecting forests against fire on the watersheds of navigable streams. This provision has been in operation during the past summer and the results are extremely gratifying.

The experience of my own state in this respect may be of interest. New Hampshire was the first state to enter into co-operation with the Forest Service under the Weeks Act and the work began on June 4, 1911. The \$7,200 allotted by the Federal government provided for the employment of 24 forest patrolmen, who worked under the direction of the State Forester. The State furnished the administrative machinery to make the patrolmen's work effective by providing supervision through district chiefs, and by maintaining lookout watchmen to co-operate with them. The actual fighting of fires was done by the

towns, again under the direction of the State Forester. The New Hampshire Timberland Owners' Association employed patrolmen for territory not covered by the Federal men. It built lookout stations where the State was unable to do so, and distributed fire fighting tools where needed. This united action resulted in confining fires in the White Mountain region during our most serious droughts of recent years to about .6 of % of the wooded area.

Realizing the great possibilities of such co-operation, it is the earnest desire of all friends of forestry that this appropriation under the Weeks Act be continued.

I have emphasized the importance of co-operative fire protection, but recognize that it is not the main feature and purpose of the Weeks Act, which was intended primarily to acquire national forests in the East. While the co-operative work now being developed will bring all the forestry forces closer together and ultimately accomplish fire protection, the actual purchase and management of forests by the government will be the only way in which many of the forests on the higher slopes of our eastern mountains can be managed properly, and the quickest way to demonstrate to private owners the practicality of forestry on their own holdings.

We rejoice, in fact, that the Geological Survey has approved over one million acres on the navigable streams in the South and that the first purchase of over 18,000 acres has already been made in that region. We regret, however, that delays have lost \$3,000,000 of amount originally appropriated and would urge upon Congress the reappropriation of this fund so it will not be lost to the purpose for which it was originally intended.

There is a strong feeling throughout New England for the early purchase of lands in the White Mountains. The Forest Service, pending the report of the Geological Survey, has examined considerable land and is ready to negotiate with the owners for its purchase as soon as a favorable report is obtained. It is my understanding that the Geological Survey is making a careful study of small drainage basins selected for the different extent to which the forests in them have been cut, that on these areas they are making a study of the relation of the precipitation to the run off in order to determine the effect of the cuttings. I am sure you will all be glad to know that the Director hopes to make a favorable report on this region this coming spring.

THE ASSOCIATION'S PROGRESS

It would seem entirely fitting at this time to recall some of the mile-stones in the history of our organization. The American Forestry Association was founded in Cincinnati in 1882. During the earlier period of its activities such men as Dr. B. E. Fernow and Mr. F. H. Newell of the Reclamation Service, were influential in shaping its policies in the support of the cause of national forestry. It advocated the passage of the forest reserve laws and was directly responsible for the initial legislation passed in 1891, giving the President power to withdraw lands from the public domain for forest reservations. It secured the appointment of a committee of the National Academy of Science, of which Mr. Pinchot, Dr. Brewer of Yale, and three others, were members. They were

to report on a policy for the management of Forest Reserves and, as a result of their investigation, President Cleveland made his now famous withdrawals of timber land from the public domain.

The Association has published and maintained the magazine, now known as AMERICAN FORESTRY, since 1898. During the past year it has taken over the circulation of the organ of the National Conservation Association. We shall do all in our power to continue the cordial spirit of mutual assistance which now exists between these two associations.

During the decade just passed the Association has been active in its support of the work and policies of the National Forest Service. Wherever possible it has co-operated in developing and aiding state forestry movements. It has constantly advocated the Appalachian-White Mountain reservation bill and my distinguished predecessor in this office, the Hon. Curtis Guild, was most potent in aiding the final passage of the Weeks Bill.

Even this hasty reference to some of the salient features in its history shows the part that our Association has taken in establishing and shaping the National forestry policy of our country.

OUTLOOK FOR THE FUTURE

Now as to the future. We want first of all to extend our influence as generally as possible over the country. We want to co-operate equally with the East, the West, the North and the South. We want to continue as an active force for the advancement of a liberal national forestry policy.

We should use our influence to obtain for the Forest Service an adequate appropriation for the administration of the national forests. All measures coming before Congress looking to the advancement of the forestry interests of the country will receive our hearty endorsement, and those measures inimicable to the purposes of our Association should be unmasked and laid before the public in their true light.

Our relation to state forestry should follow the same lines, with slight variations as to details. We shall co-operate in any movement for the establishment of state departments of forestry throughout the country and for the development of effective forest fire protection. We can do much through our publication toward educating and preparing public opinion for a more equitable and scientific method of forest taxation.

We should encourage the establishment of state forest reservations wherever such action is possible.

Our Association is especially adapted to become a medium for creating more complete co-operation between the Federal government, state governments and private timberland owners.

We can serve as a uniting link to bind all local forestry societies into one unit, in order that they may bring the greatest influence to bear on public questions affecting the timber policy of the Nation. We can serve as a clearing house for the exchange of ideas and experiences in forestry from all sections of the country. Furthermore, we should get in touch with those states which

ALL THAT REMAINED OF A FINE FOREST AFTER A DESTRUCTIVE FIRE.





ANOTHER VIEW OF DESTRUCTION CAUSED BY A FOREST FIRE.

have no local organizations and fill the gap until local forestry societies are firmly established.

Our magazine, AMERICAN FORESTRY, can perform a public service of first importance by advocating all the foregoing policies. The extent of its usefulness is directly measured by its circulation and it is our purpose to extend that circulation by every means at our command. In this endeavor I solicit the active co-operation of every member of the Association.

We are planning to give this magazine a more popular tone than it has heretofore had. This we hope to accomplish by lessening the number of technical articles and broadening the scope of the publication. We want to put it in the hands of as many timberland owners and people interested in forestry as we can possibly reach.

In closing let me emphasize the fact that the American Forestry Association is entering on a new era in its activities. It is adopting a definite constructive program for the future, to which it will give its unqualified and vigorous support. We are striving to enlist the active interest of influential public spirited men and women throughout the country. We are engaged in a task which, if successfully consummated, will inure to the fundamental and permanent benefit of the whole Nation. Let us all put our shoulder to the wheel and help.

The New York Conservation Commission which has made an examination of the forest conditions on lands of State institutions, at the request of the Fiscal Supervisor of State Charities, reports that of the total acreage of 8,908, about forty per cent, or 3,568 acres, is badly in need of the application of practical forestry.

Traces of the deadly chestnut blight which was believed to be confined to the eastern section of Pennsylvania have recently been discovered in the western section west of the Alleghenies.

The Pennsylvania State Branch of the National Conservation Association is arranging to launch a plan for a state park. Governor Tener, is understood to be heartily in favor of the plan.

Hon. J. J. Kindred, Representative from the 14th District of New York, has had printed in the Congressional Record, the resolutions adopted by the American Forestry Association at its annual meeting on January 9, and Representative F. E. Wilson presented the resolutions to the House of Representatives.

The Southwestern Lumbermen's Association held its annual meeting in Kansas City, Mo., on January 24, 25 and 26, and members report that it was a very successful gathering.

OPPORTUNITIES FOR FORESTERS

By PROF. AUSTIN CARY
UNIVERSITY OF MINNESOTA

A CONDITION has been reached just recently to which some have been looking forward for a considerable time—an excess in the number of graduates of forestry schools over the number of opportunities for employment in the line of work toward which most of them have thus far gravitated. Over one hundred and seventy men took the examination for Technical Assistant in the Forest Service last spring, while the Service had places open in that regular grade for only about sixty of them.

Fortunately, there are other opportunities. The Service has taken in many as rangers or on a temporary basis. The developing reserves in the Lake States have wanted some new men; and just lately the administration of the Indian Office has made room by beginning the organization of a technical force. The work of the older states and of teaching calls each year for a considerable number. In one and another of these ways the bulk of the class has now been placed, the balance going out into private employment. 1911, however, marks a turning-point in Forestry education in this country in that the National Service failed to claim the men available. The fact is notable enough to start discussion as to present tendencies in the Forestry movement, and especially regarding the nature of the training given in the schools which have increased so fast in numbers in the last few years.

Regarding the schools and the courses of training they offer, newness is one feature which is evident and which it is worth while to recall. It is little over a dozen years since there were no forest schools in this country, and many of us can remember our own lack of faith and confidence when the first professional forest school was established at Cornell. That school was established by an able man, thoroughly grounded in forestry science and familiar with the position and achievements of the profession abroad. The course of study was broad and fundamental, and it is not to its discredit that the school was later closed.

Again, when Pinchot and Graves founded the Yale School of Forestry they had a perfectly clear idea of what they wished and expected to do. They felt the need in the country of a body of broad-gauge, high class men to lead in the movement of that time—men to start the National Forest work on a high plane, to guide state legislation, to serve as teachers and leaders throughout the country—men of intellectual capacity and of enthusiasm, who could be counted on to push their own way in whatever direction they might get turned. It was a bold conception strongly followed up, and the judgment of those men is fully vindicated today.

A considerable number of courses in technical forestry have been opened at colleges and universities within the last eight years. Several are graduate



PENNSYLVANIA STATE FORESTRY STUDENTS LAYING OUT LOGGING ROADS OVER LANDS RECENTLY JUMBERED AND BURNED.

Photo by Hugh E. Burt.



Photo by Hugh P. Baker.

PENN STATE FORESTRY STUDENTS MAKING GROWTH STUDIES IN FELLED HEMLOCK.

schools, requiring a college degree for entrance. More give undergraduate work. The curriculum in these schools is laid out closely after one pattern (silviculture, mensuration, management, protection, etc., tied more closely to botany than to any other related science) and the majority of teachers are very recent graduates, giving out, without great added resources derived from experience and independent study, what was given to them. Precedent and the National Forest work together have given tone to the thing. If newness is one feature of forestry training in our colleges and universities, comparative similarity of aim and method is another. One feature is undoubtedly connected with the other, and a main point of the present discussion is to see if we do not need to diversify our work and broaden our field.

SOME REFLECTIONS

The following reflections may be considered as more or less sound:

First—The natural relation of forestry to agriculture is evident, and the farmer is usually situated so as to utilize knowledge of forestry principles. Some instruction in forestry ought certainly to be given in every agricultural college, and many efficient men will likely gain entrance to the forestry profession through this means.

Second—Because of the interest and educational value forestry science has, and because the forestry cause needs the co-operation of influential men, the subject may win some place in general collegiate, as in popular, education.

Third—But training which professes to equip a man for a calling is a different thing. The number of schools and size of classes will of necessity be limited by the opportunities for satisfactory employment which graduates can find, and training must be carefully adapted to the service it is to be put to. This seems axiomatic to be sure, but may not be as simple as it looks. At any rate, if changes are needed or promising fields as yet unoccupied can be found, recognition of this is important not merely for the schools themselves whose field may be enlarged, but to the forestry cause in general, for nothing surely can promote it more effectively than to have its interests bound up with the present fortunes of a body of active, intelligent men.

Answer to the questions whether schools of forestry are giving the best sort of training to their students and whether they are fulfilling to the utmost the purpose they might serve will largely turn on our conception of what forestry is and of the kind of man who may be rightly denominated a forester. Ideas are not settled and uniform on those points.

"The Forester" to the United States Government and the forestry officials of some of our states represent the term to many. These men have big executive duties imposed upon them and by nature of their offices must be somewhat in the line of diplomats and politicians as well. Large capacities are essential for these men and the broadest training is none to good. The profession is being stretched to fill these places creditably today, but it doesn't require many men to fill them.

Many think of the forester as an observer, inquiring into the facts, botanical, entomological, silvical, and others that relate to forest life and growth and putting results out in literature perhaps, to be utilized or to fall

by the wayside as the case may be. Useful work this when well directed and carried out, but the same rule holds as before that no very great number of men can be supported in it. The case stands the same with the teachers. These will be maintained only to the extent to which there are those to be taught

But there is a sense, as consideration will show, in which all these classes of men are hardly to be called foresters themselves at all. They teach forestry, study forestry, make forestry possible, but forestry itself as an art, consists in practice, in the intelligent management of forest land; and the forester is or will be the man who directly carries out this work. Such when independently looked at seems to be the simplest and most evident meaning of the terms. Such men are the foresters of Europe, or nine-tenths of them are. This direct and practical conception, some believe, is a very important one for the schools to grasp more clearly at the present time.

FORESTRY WORK IN THE WEST

The truest representatives of the forestry profession, as it exists in the country today, are probably the men who after the sifting of the last half dozen years are now bearing in the West the load of administration of the National Forests. These men have been too busy with their own jobs to have had much to say about other things, but they have been piling up experience, and now, with their work reasonably well in hand, they see clearly what it is going to be like and have ideas of their own as to the kind of men they want to help them in it. For them many illusions have been dispelled. The work has been different far from what they thought it when they left their studies. These they have had to forget mainly while they devoted themselves with all the force there was in them to meeting certain big, rough, insistent conditions and facts. The scientific principles which they were taught in college are not indeed lost, but for the present they are in large measure thrust into the background of their minds. The day's work meanwhile is nine-tenths plain, straight administration—protection, development, surveys, business dealings with a variety of people, in circumstances not guaranteed to be either easy or pleasant, for the glamor of frontier life has mainly passed away.

Now these men looking out from their own experience toward future helpers and successors, do not despise college education or technical training; in the plans of the Service they do not fail to recognize the necessity of exact scientific study of the elements with which they deal; least of all do they undervalue a grasp of and loyalty to the big, simple, underlying principles of forestry. But they do see that proper balance among interests has to be maintained, and that to them means that for a long time to come the scientific aspects of the work, as far as time, expenditure and numbers of men are concerned, must take a secondary place. If anything were needed to show the soundness of this position, last year's fires in Idaho and Montana ought certainly to serve.

To those responsible for the forest schools these men would say that while they expect always to welcome a considerable number of highly trained



PENN STATE FORESTRY STUDENTS VISITING STATE FOREST NURSERY AT GREENWOOD FURNACE, PENNA.

Photo by Hugh P. Baker.



FORESTRY STUDENTS IN CAMP.

Photo by Hugh P. Baker.



Photo by Hugh P. Baker.

THE GROWTH OF SEEDLINGS FOR PLANTING ON STATE LANDS

men to their forces, supplies of that sort do not by any means solve the problem of forest administration. The Ranger force is quite as essential—plain, simple men ready to do and to stay with the actual work in the woods. Further, they would say, or some of them would, that the technical men so far supplied have not by any means been the fittest possible instruments for the work. Natural fibre and adaptability have full more to do with efficiency than training. Too much schooling may make men over-fond of theory, conceited in its possession, needlessly hard to break into actual service, or even entirely unfitted for the rough work in hand. The high ideals which the schools can justly claim for most of their men, are desirable, only, to be effective, they must be bound up in a physical and mental make-up which causes a man to enjoy and last at this kind of work.

Now young men brought up in towns and cities and going through eastern universities may indeed develop into the best possible material for the work of the National Forests, but it is by no means certain that they will. Plenty of young westerners with very limited training who drift into the Service from natural adaptability are proving of just as much use. The technical men, at any rate, must stand the test of efficiency in actual service.

CHARACTER OF THE WORK

To review: The work of administration of the national forests is in the main plain, rough work and backbone of the Service will always be made up of men who in the good sense are essentially plain and simple minded, satisfied to stay with their jobs and in the conditions which they involve. Natural fitness and capacity are essential for these men and appropriate training which will enable them to understand the things immediately about them, but not necessarily of a very broad or elaborate type, will be a great help. And for men who on this level show exceptional ability lines of promotion must be forever kept free. For a considerable number of them of thorough technical training there will always be room, for specialties and in scientific positions to a limited extent, but more numerous in the administration force. Requirements here are changing somewhat and standards are steadily rising. Experienced Service men believe that the training of the majority should be more largely on engineering and business lines than it has been in the past, with less emphasis perhaps on botanical studies.

So much for this branch of the subject.

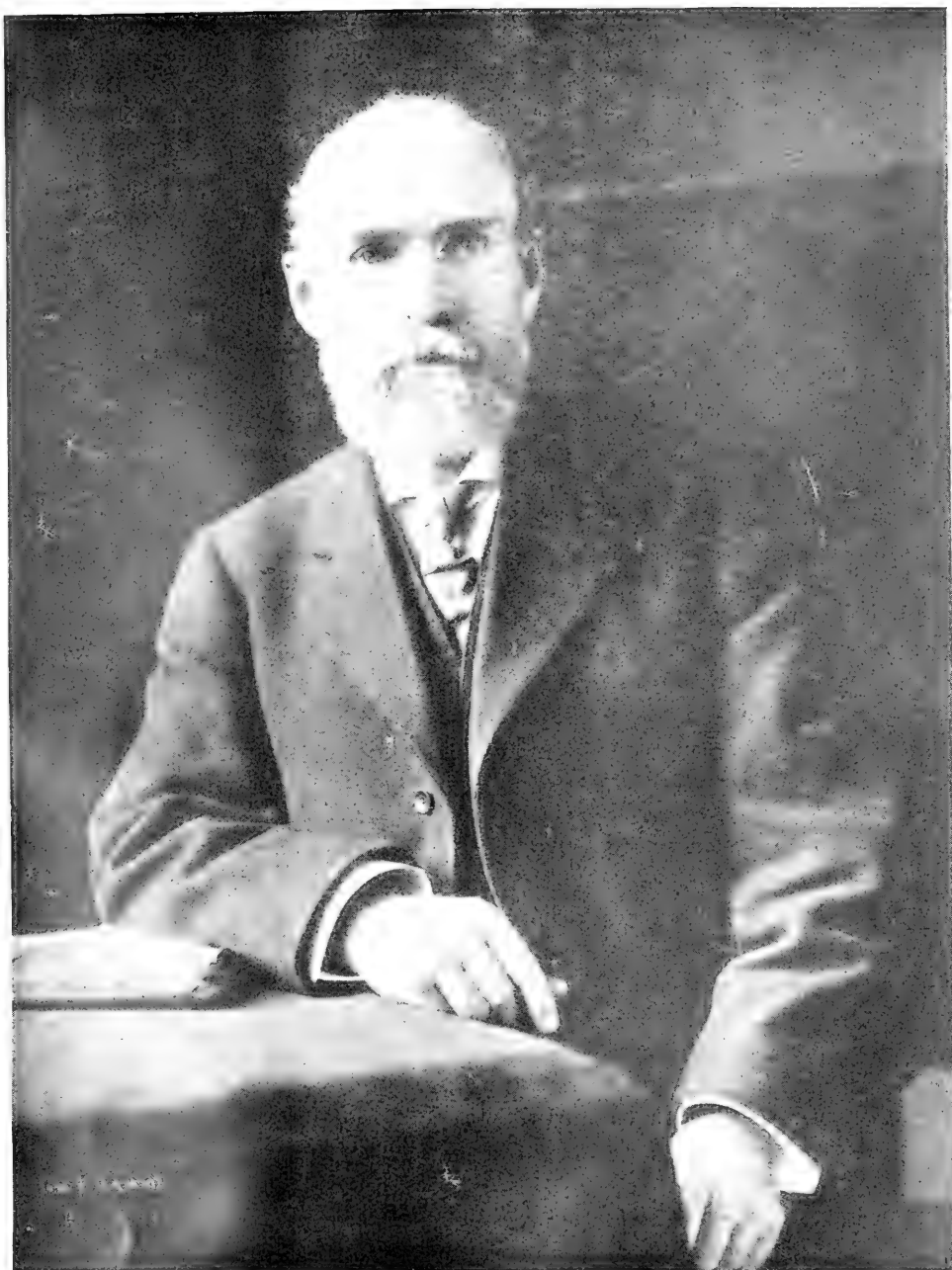
With all that the forestry movement has accomplished for woodlands in the country at large—valuation greatly increased, economy promoted, a general attitude of thoughtfulness brought about—it is on the whole a disappointing impression which has been made on the actual management of privately owned lands. There are good reasons, on one side and on the other, why progress should be slow here. On the side of the land owners fire risk and the tax burden are hindering the adoption of conservative, foresighted management while that able young foresters have not engaged more largely in the work is due to the wonderful opportunities that were open elsewhere. Men who are in the swing of the development of the national forests, guiding legislation in the states, or laying the foundations of American forestry science could not be expected to turn aside to less attractive looking work.

This is all easy to understand and the fact that forestry has thus far made no closer connection than it has with business would excite no comment if the profession had not professed all along to be doing that very thing. But we have for years past proclaimed ourselves as teachers and missionaries to the lumbermen. We have been profuse with co-operation and advice; occasionally a man has gone with a business concern for a few months to show them how to do it, and large claims have been periodically made for the results attained. Time and reflection, however, show these claims to be mainly hollow. Candid foresters today admit that it is a discredit to the profession that so little privately owned land is under their control, and the lumberman, while he grants the soundness and final necessity of the forestry idea, says that as for the actual application of forestry principles to his own property and operations they have got yet to show him. Yet it is forestry in business, good management of the vast area of woodland owned by private individuals and corporations, that really spells abundant timber supplies in the future. Further, since voluntary, co-operative methods are far simpler and cheaper than government ownership or regulation of cutting by law it is up to the forestry profession fully and carefully to work this lead out. There is indeed a vast and important work to be done here. As the proclamation of the national forests and the beginning of their administration was the big work in forestry in the last fifteen years, so the sifting out of all the possibilities of good forestal and financial management on private forest lands is likely to be the big work of the next fifteen.

FORESTRY AND LUMBERING

A main reason why forestry has made no more vital connection than it has thus far with lumbering appears to the writer to lie largely in a stilted and overstrained conception of the terms forestry and forester. If so the direct, practical conception outlined some pages back, of the forester as the man in actual control and management of forest land, will serve as an antidote. So far, however, we have strictly denied the application of the term to any man who, outside of the National Forests and certain enterprises and pieces of land, stood in any such relation to forest property. For this course there may indeed have been good and sufficient reason in the past, but it is clearly hampering progress today. Business in large measure is now hospitable to forestry, genuinely seeking to understand its principles and find out how they may be applied, and the most cordial, thoughtful co-operation is due from the forestry profession. To that end, however, more vital contact and mingling is essential. Business men know, if foresters do not, that men standing outside of business cannot get a thoroughly effective point of view and are bound to miss essential points. There is a limit beyond which the missionary spirit will not go, when comradeship and appreciation must come in or progress will stop. The true economic condition of the country requires recognition in a toning down from theoretical ideals to the standard of what can actually be done. In a word it is forestry on the level of business, foresters inside of business organizations, and not outside, that from now on will actually do the work.

In maintaining the present unsatisfactory condition the schools have



DR. CHAS. R. VAN HISE, PRESIDENT, UNIVERSITY OF WISCONSIN. ELECTED A VICE-PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION.



CAPT. J. B. WHITE, KANSAS CITY, MO., PRESIDENT, NATIONAL
CONSERVATION CONGRESS. ELECTED A DIRECTOR OF
THE AMERICAN FORESTRY ASSOCIATION.

had their share along with the rest of us. Founded on European models, located at intellectual rather than business centers, under obligation first and in any case to teach the principles of forestry, science and policy which the country so much needed, with a teaching force young, very limited in its knowledge of actual operations in mills and woods, the schools could not in fairness probably be expected to get to the bottom of these matters and give their students an effective point of view. Teachers could explain how land ought to be stocked in order to produce to the utmost; they could recount the steps in the different silvicultural systems; they could explain the interest of the community in the maintenance of forest cover and productiveness, and tell how under European governments that was secured; they know the forms gone through in making a Forest Service timber sale, and even had the supervision of some pet pieces of land. But American lumbering as it exists in the country today they have felt no kinship to and no obligation really to study and understand. As for woods operations the schools have apparently failed to see the fundamental fact that they are nine-tenths engineering. Courses of instruction in lumbering methods have been late, superficial and unsympathetic.

In consequence the men attracted to the forest schools have seldom been of the type to make or to co-operate with lumbermen, or if they were such at the start their forestry training likely spoiled them for any such work. Thus while lumbermen have been employing graduates of colleges and technical schools in various departments of their business, the majority of those who have had experience with forest school graduates simply say that they cannot be used.

If the view above expressed, that forestry had less effect in lumbering than it might have had, is true in the main, there are enough exceptions not merely to prove the rule, but to indicate the way in which more effective work may be done. The foresters now employed as secretaries to lumber dealers' associations have opportunity in a quiet way to exert a great deal of influence and there is every reason to suppose that they do. A number of men with more or less forestry training now have positions with lumber or pulp concerns in Canada. The more careful and responsible timber estimating of New England is fast coming into the hands of foresters, and recently a trained forester in an important case for damages caused by railroad fires, by means of scientific estimates, beat a whole array of Maine woodsmen into their boots. On the Pacific Coast a number of trained men are succeeding at timber estimating or as forest engineers. The Yale School of Forestry now advertises an elaborate course in lumbering connected with its regular forestry work. Lastly we have the Biltmore School, taking the sons of lumbermen and others going into the lumber business, and giving them a practical training with as much of an insight into forestry science and policy as such men will stand.

The point in the above is this—that the men above mentioned are not doing academic work merely, but are making vital connection between the two things, **lumbering** and **forestry**. They are getting actually to bear on our forest resources. If they are not anywhere bringing about the ideal they are actually improving things to some extent and putting themselves in a

way to attain later positions of actual command. On the other side moreover, we should not by any means neglect the recent movement among lumbermen, most prominent in the South and on the Pacific Coast, to cheapen their work and put it under system in ways similar to those by which other important lines of production have long been managed by engineers.

Here indeed is believed to be an indication of the way in which forest schools may greatly help themselves and at the same time powerfully serve the present and future needs of the country. With increasing values of land and timber and the growing complication of lumbering operations, the helter-skelter methods of earlier times in the lumber business are no longer economically sound. Lumbermen realize this, are studying and systematizing their operations and are ready to revise them on any lines that are economically and financially sound. To do this work is calling yearly for men of larger capacity and better intellectual equipment to serve as expert cruisers, logging engineers and managers of plants and concerns. Here is the opportunity of the schools—to supply men of fit training for this important work who have an insight into the principles of forestry as well. Business will eagerly welcome such men for what they can do now, and when they have proved their capacity and judgment in lines that are familiar will give them freedom also in lines which are new. Such work as this will require sturdy, calculating men with no sentiment about them, and the work itself will hardly be recognized as forestry by some who in the past have been arbiters of opinion; but forestry it is in our circumstance and time. It is not surrender of or disloyalty to principles; it is just putting those principles into a form such that in our day and generation they can actually be used.

To review again, in this branch of the subject—the forest schools as yet have failed to master American lumbering technically; they seem not to have understood its economic necessity and limitations, and they have not sympathized with it as they might. To continue on this line, teaching “forestry” as they conceive it, which the lumberman may take or leave as he sees fit, is dignified certainly, but is not so co-operative and profitable an attitude as can be conceived. There will always certainly be a field for just this kind of work and fundamental principles will have to be taught even more thoroughly than they are today. But some, both lumbermen and foresters, who have thought the matter over, think it ought to be supplemented with training for a different purpose and with the weight of instruction changed. They believe that schools well located and well equipped that will furnish a training strong in engineering lines, including a comprehensive view of lumbering methods, and at the same time, through hard, compact, fundamental teaching, give their students an insight into silvicultural principles and forest policy, will make their own fortunes and do a great work for the country as well. Their graduates will go into actual business and soon win their way to executive and financial command. They will organize lumbering work as other lines of production have been organized by engineers, securing great economies thereby. They will introduce conservative, foresighted management progressively, as it becomes practicable. They will be the best possible safeguard and buffer if ever the time comes when it is necessary to regulate lumbering operations by law.

THE PRESENT SITUATION IN FORESTRY*

By HENRY S. GRAVES
CHIEF OF THE FOREST SERVICE

I AM reminded today of the luncheon given by the American Forestry Association just eleven years ago which I attended and at which I believe I discussed the problem of state forestry with special reference to New England. If I recollect correctly the subject of the need of federal forests in the eastern mountains was also discussed at that luncheon. During this period of eleven years the forestry movement has advanced far beyond the expectations of any of the men engaged in the work at that time. Today we find that there is an exceedingly favorable public support of the principles of forestry throughout the country; a policy of national forestry has been definitely established; many states have initiated a vigorous policy of public forestry; and we have already several hundred trained foresters in the country as a nucleus of a profession to carry on the work. It is certain that we may be gratified with what has been done, and to this association is due appreciative congratulations for the part it has taken in all this development.

So much has been done in a short time that it has appeared to some that the principal task has already been accomplished. This is very far from being the case. Only the first steps have been taken and the chief work of getting forestry into actual practice still lies before us. This is true of the work of the practicing foresters; it is equally true of the work of this association. The association has served most usefully for a period of thirty years; its greatest usefulness is in the work it may do now and in the future. The situation has changed only in this respect that with the foundations of a favorable public sentiment already laid, the association can now do far more effective work than it ever could do in the past, in the promotion of the practice of forestry throughout the United States.

THE WEEKS LAW

The most conspicuous incident in national forestry during the past year has been the passage of the so-called Weeks Law, authorizing the purchase of forest lands which lie upon the watersheds of navigable streams. Heretofore the problem of the National Forests has concerned the administration of property already owned by the Government. The Weeks Law is of great importance, not only because of the direct results which will be obtained through the establishment of National Forests in the East, but also because it still further strengthens the whole policy of national forestry. It is a direct recognition of the interest of the public in the proper handling of forest lands situated in mountain regions, and a recognition also that the

*Address by Henry S. Graves, at the Annual Meeting of the American Forestry Association, Washington, D. C., January 9, 1912.

participation of the public itself is necessary to accomplish the establishment of forestry in practice.

While the Weeks Law does not specifically designate the areas within which purchases are to be made, it is understood that it was the intent of Congress that there should be established, if possible, National Forests in the White Mountains and in the Southern Appalachians. It is not expected that all of the areas upon which it is desirable that there should be practical forest conservation can be purchased by the Government. It is expected, however, that, even with the appropriation already made, a number of National Forests can be established on important watersheds which may serve as centers of forestry and which will aid in bringing about the protection and better handling of the surrounding country. One of the first steps which will be taken after the establishment of one of these forests will be an effort to establish through coöperation organized fire protection in the area surrounding them. Since the passage of the law a large number of offers of lands have been made to the Government, and already examinations have been conducted on 500,000 acres by the Forest Service and Geological Survey. The mere offer of lands and subsequent examination does not, however, necessarily mean a purchase. The examination includes a consideration of it as a desirable property for the Government from the standpoint of the purposes of the law, and a careful appraisal of the value of the land. It frequently happens that the owner of the property and the agents of the Government do not agree as to its value. I have no doubt that some people may be impatient on account of the failure of the Government to purchase certain areas, when the reason for this failure is the fact that the price proposed by the owner is excessive. It is, however, expected that there will be no great difficulty in acquiring lands both in the White Mountains and in the Southern Appalachians, whose administration in the long run will have an enormous influence on the development of forestry throughout the regions in which they are located.

In the development of a National Forest policy it has consistently been recognized that one of the purposes of public ownership and control of forests is to insure the benefit of their protective influence in preventing erosion and their effect on streamflow. In some of our National Forests the protective value exceeds the timber value, as, for example, those in southern California. The same idea is dominant in developing a policy of purchasing National Forests in the East. In fact, the only legal ground on which the purchase of forest lands can be made, according to the interpretation of the authority of Congress by the Judiciary Committee of the House, is to protect navigable streams.

PROTECTIVE INFLUENCE OF FORESTS

In the development of National and State forest policies questions have frequently arisen in regard to how far the influence of forests on streamflow, on rainfall, and on erosion extends. Some have gone so far as to doubt this influence almost altogether. Much of the confusion regarding the influence of forests on streamflow has arisen from the failure to recognize that the





DR. FILIBERT ROTH, DEAN OF FORESTRY, UNIVERSITY OF
MICHIGAN. ELECTED A VICE-PRESIDENT OF THE
AMERICAN FORESTRY ASSOCIATION.

vegetative cover of a given watershed is only one of a number of important factors governing the flow of water. There has been so much discussion of this subject and the position of the foresters has been so repeatedly misinterpreted that I shall digress from my main subject for a moment to state my own position in the matter.

First, the quantity of water in streams, and the regularity of their flow, are affected by precipitation, temperature, topography, vegetation, character and condition of soil (including cultivation, etc.), and rock character and position. The interplay and relative importance of these factors vary greatly in different localities and regions. In general, the most important of them all is the amount, character, and distribution of the precipitation.

Secondly, ample evidence is furnished by prolonged European experiments and investigations of unimpeachable scientific authority, as to the fact that a forest cover exerts, under most conditions, a very important influence upon streams. This influence, however, has a limit and may be overbalanced entirely by other factors, such as heavy rains and sudden thaws. Forests can not, under prolonged precipitation or other exceptional conditions, prevent large floods, but they tend to diminish both the number and the violence of floods.

Thirdly, while forests transpire, and growing forests consume more water than other forms of vegetative cover, and so may lessen the aggregate volume of stream discharge in the course of a year, they tend to make more water available by regulating this discharge and by modifying the distribution of rainfall.

Forests regulate stream discharge (a) by converting surface run-off into underground seepage, and (b) by checking erosion.

Forests convert surface run-off into underground seepage by checking the force and prolonging the period of rainfall, through the action of the tree tops, and by accumulating snow and retarding its melting; by checking surface run-off through the action of roots, leaf litter, twigs, and fallen trees; by shortening the period during which the ground is frozen and impermeable to water, and by creating and maintaining a permeable and absorptive soil.

Forests check erosion by the same means by which they convert surface run-off into underground seepage, and also by the binding effect of tree roots upon the soil. The less the volume of water which runs over the surface of the ground, and the more slowly this water moves, the less is its wearing effect. On steep slopes, or on friable soils, surface run-off creates gullies, torrents, and consequent rapid and permanent physiographic change.

The results of forest destruction are both to make run-off progressively more sudden, tending to increase the violence of floods, and to load the streams with silt and coarser material. The degree to which the removal of forests or any other vegetative cover increases erosion varies according to the completeness of its destruction and its recuperative power.

The conversion of run-off into underground seepage and the checking of erosion are the two essential forest influences which act together to control flood conditions.

ADMINISTRATION OF THE NATIONAL FORESTS

Aside from the Weeks Law there has not been any striking legislation touching national forestry during the year. There has, however, been very great progress made in national forestry, especially in the administration and protection of the National Forests. We have now reached a point where the first work of initiating the administrative machinery has been completed. The general lines of new policies have been established, and the work now consists of developing the details of these policies in actual application on the ground. We now have an organized administrative force and our work consists of the protection of the Forests, the conduct of the local business, and developing the Forests for their highest usefulness as rapidly as possible. This is work about which the general public hears but little. It is, however, the work which counts, and in which during the past year the Forest officers on the ground have been making great forward steps. This is well demonstrated by the results in protection from fire during the past season. In spite of the fact that certain sections of the West, particularly in Oregon and part of the Central Rockies, were as dry as in the previous year, nevertheless the record is the best of any since the establishment of the National Forests. Over 2,000 fires were started, and all were put out. Only a few single fires did any substantial damage. While these good results in fire protection were due in part to a better season from the standpoint of the distribution of rainfall in most parts of the West, they were also due to a more complete organization of the protective force; to a better equipment of the foresters for attacking fires; to the increase in trails, lookout stations, and other improvements; and to a more favorable public sentiment.

We have, however, still our greatest task ahead of us, for it must be remembered that most of the National Forests are still great undeveloped wildernesses without adequate means of transportation and communication. Every year we are building, as rapidly as available funds permit, roads, trails, telephone lines, lookout stations, and other improvements necessary for protection and administration. It will, however, require fully 15 years at the present rate of expenditures to complete the primary system of permanent improvements needed for protection. Every year we are going to have a hard fight with the fires, so that our greatest problem is now, and will remain for a long time, that of protection. With the continued support of Congress there will be a steady development of the Forests in a way to meet the needs of the people dependent upon them both from the standpoint of the present and the future.

PROGRESS IN STATE FORESTRY

A very great obligation rests also on the State governments in working out the problem of forestry. Only a few States in the entire Union are as yet fully meeting this obligation. The great problem of the States in forestry today is to bring about the protection and proper handling of private forests. Organized fire protection under State direction, establishment of a reasonable system of taxation of growing timber, conservative management of State forest lands, education of woodland owners in methods of forestry, and such

practical regulation of handling forests as may be required for the protection of the public,—these are problems requiring immediate action in all States.

During the past year there has been more real progress in State forestry than in any previous year. The feature which stands out most strongly is that a number of States have gone beyond merely passing forest laws, but have begun to provide the money necessary to achieve practical results.

The principal work in the different States has been directed toward fire protection. At length it is realized that the prevention of fires is the fundamental necessity, and that this can only be accomplished by having a thoroughly organized State Forest Service. Excellent laws are being passed in various States looking to the removal of the causes of fires, as restrictions placed upon railroads to prevent fires from locomotive sparks, regulations regarding the burning of brush, carelessness of campers, etc. But these laws are ineffective unless there is adequate machinery to carry them out. A fundamental principle of fire protection is preparation. A forest region must be watched for fires, both to prevent fires from being started and to reach quickly and put out such fires as may start.

The new State legislation recognized these principles and already fully twelve different States have inaugurated a measure of fire patrol or watching under State direction.

Still another element has been introduced into State forestry—namely, restrictions upon lumbermen to make a proper disposition of their slashings, in order that the lumbering may not be a menace to the surrounding forests.

The scope of this paper does not permit of an analysis of the various laws recently passed in different States. Special attention may be directed to the new forest laws of Minnesota and Oregon, and to the organizations which are being developed. Important new laws or amendments to old laws have been passed also in Maine, Vermont, New Hampshire, Massachusetts, New York, Maryland, Michigan, Wisconsin, Montana, Washington, and Louisiana. The new Conservation Commission established in California promises to lead to important results in forestry and other branches of conservation. Illinois has made a beginning, making an appropriation to study the conditions of the State looking toward the development of a system of State forestry. Several States have made a beginning in forestry through their State institutions, as in Colorado and Missouri. Idaho and South Dakota have entered upon a policy of exchange of lands with the Federal Government, which will lead to the consolidation of the State forest lands and the establishment of a State forest, a move which I hope will be followed by other States having similar holdings.

While the record is good in some States, there are still many which are doing nothing whatever in forestry. Under the provisions of the Weeks Law the Federal Government may assist a given State in the protection of forests lying at the source of navigable streams, provided that State has established and is supporting a system of fire protection. Such assistance has been given during the past season to Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New Jersey, Maryland, New York, Wisconsin, Minnesota and

Oregon. Most of the other mountain States can not receive this assistance because they are not themselves making proper provision for fire protection under State direction.

PROGRESS IN PRIVATE FORESTRY

The real advance made in private forestry during the past year has been in fire protection. Woodland owners are coming more and more to realize the damage done by forest fires, and are taking action on their own initiative to secure better protection. Taking the country as a whole, the damage by fires is becoming more and more localized. There have been, for example, during the past summer, very serious fires in certain localities, chiefly in centers of prolonged drought. But the number of disastrous fires is decreasing and they are not as widely distributed as formerly. The average farmer is today endeavoring to keep fire out of his woods, so that the damage to the small woodlots has been very greatly reduced. Among the large timber tracts the situation is also better than ever before. Not only have the individual private owners in many sections increased their efforts in fire protection, but there has been an extension of the idea of co-operative fire protection among owners of contiguous lands. The work of the fire protective associations is from year to year more effective as the organization is perfected and the force gains experience. An important factor in the fire protective work on private lands has been the increased assistance given by the states and by the Federal Government. The problem of fire protection on private lands is as yet by no means solved. The great gains during the last few years, however, show that in certain regions at least we are on the road to gaining mastery over the worst enemy of the forests.

Protection from fire is only the first step in forestry. Protection alone will not ensure the continuance of forest production. Without the use of forestry methods, ordinary lumbering results in a continued reduction of growth of valuable species.

The problem of forest production is making advances only in those regions where there is a good market for forest products. In such regions, as for instance in New England, the woodland owners are coming more and more to adopt careful methods of cutting, and in a great many instances are planting trees.

On the other hand, the handling of large timber tracts with a view to continued forest production has made but little progress. The number of large owners doing any work in forestry beyond fire protection is exceedingly small, and very few of them see any prospect of much being accomplished by them under the present conditions.

The problem of the large owner is a peculiar one. Ordinarily, he has purchased the land for the merchantable timber upon it and does not expect to retain ownership of the property after cutting. He usually has no special plans regarding the future disposition of the land. He may hope to sell a portion of it for agricultural development; the balance, which is unsuited to agriculture, he will dispose of in whatever way will bring in the greatest

returns. But there is seldom any idea of holding a considerable portion of the land for the production of new crops of timber.

The problem of the permanence of use of land for forestry is fundamental. The average owner does not make investments in forestry on lands which he does not expect to hold for this purpose, or which will not have an increased value for sale later on by reason of his investment. Wherever there is a measure of permanence in ownership of forest land, forestry becomes a practical business proposition. Forestry requires a consistent policy of use on account of the length of time needed to produce a crop of trees. Land subject to speculative holding does not attract investments in forestry, because the element of stability of policy in use for forest production is lacking.

It is estimated that our private forests comprise some 350,000,000 to 400,000,000 acres. About one-half this area is in small holdings, much of it comprising woodlots attached to farms. The farm woodlot presents very favorable conditions for forestry. A good woodlot is a great asset to any farm. Ordinarily the area devoted to the woodlot is not suited to agriculture and will be left to tree growth. It is just as much to the advantage of the farmer to maintain the productiveness of his woodlot as the productiveness of his fields, not only for his own benefit as long as he owns the property, but because of the enhanced sale value of the farm. Public education and demonstration of the practice of forestry will go far to meet the woodlot situation.

There are also some large lumber companies which are organized on a basis of permanence, which expect to hold their lands for successive cuttings rather than to strip them and then either dispose of them or allow them to revert to the State for taxes. For such large owners forestry is a necessity.

We have therefore the very small owner and the very large owner in the best position to practice forestry. The reasons are the same in both cases, namely, that there is a permanent tenure of the land.

The problem most difficult of solution and in which the least progress is being made concerns the holding of the average lumber company. We may assume that a small portion of this land will be absorbed by the Government and the states as public forests. A portion also will be found after cutting to be chiefly valuable for agriculture and will be used for that purpose. Such areas may in the present discussion be left out of consideration.

The first necessary step is to remove the two greatest obstacles in the way of private forestry—namely, risk from fire and an unfair system of taxing growing timber. This can only be accomplished by the action of the public through State agencies. This action will in itself encourage the holding of land for timber production.

The public will, however, not be satisfied with a mere encouragement of forestry, if it makes investments in fire protection and concessions in taxation. It will very properly demand that the private owners do their part not only in preventing dangerous slashings in their operations and also in continuing good productive conditions on those lands not suited to agriculture.

Already several states have introduced the principle that the slashings after lumbering shall be so disposed of as not to be a menace from fire. It is

inevitable, in my judgment, that there will be an exercise of a greater measure of direction by the public over private forests than is now the case. I look for the time when the states will designate certain lands as *Protection Forests* within which the cuttings must be made with a view to the continuance of the forest.

It is commonly said by land owners that forestry is not practical. This is usually due to the fact that they do not fully appreciate just what forestry requires and what would be gained by it. As a matter of fact, the practice of forestry would in a very large number of cases not only be practical, but would result in a considerably increased return to the owners. The time has come when lumbermen should make an actual beginning of forestry on their own lands, even if the first work is purely experimental.

ACTION BY THE IRRIGATION CONGRESS

MAKING cognizance of the importance of forest preservation, the National Irrigation Congress, which met in Chicago, devoted a portion of its resolutions to the subject, as follows:

Recognizing the close natural connection between forests and stream-flow, especially throughout the irrigable region, we heartily commend the Federal forest policy and favor its continuance and extension; and we reaffirm our full confidence in the high integrity and exceptional intelligence of the past and present officers of the United States Forest Service.

Approving the progressive withdrawal of lands suitable for homesteads from the National forests, we hold that such withdrawals should be made in the light of expert investigation showing that the agricultural value of such lands is paramount to their value both for forest production and for stream protection.

We favor the enactment by all states of laws to regulate the cutting of timber on State and private lands, and laws reforming taxation on timber lands, cut-over lands, and reforested lands, to the end that the perpetuity of the forests may be assured and the flow of the streams be preserved.

We approve, and direct our Senators and Representatives in the Federal Congress to support, the Burke Bill (H. R. 14085) reappropriating and rendering available the lapsed portion of the sum appropriated to provide for the Appalachian and White Mountain Forest Reserves in accordance with previous recommendations of the National Irrigation Congress.

The India Forester, published at Dahra Dun, U. P., India, impressed with the article on fighting forest fires in a recent number of American Forestry publishes a goodly portion of it, with special reference to the value of the telephone in giving warning of forest fires.

One of the American consuls in Europe reports that with the exception of the forests of the Mississippi Valley and those of the Asiatic Caucasus the oak forests of Slavonia are without equal.

THE ANNUAL CONVENTION

MEMBERS of the American Forestry Association present at the thirty-first annual meeting of the association at the New Willard Hotel in Washington on January 9, 1912, declared that it was one of the most successful and enthusiastic meetings that the society has ever held. There was a gratifyingly large attendance, and at the director's meetings in the morning and afternoon, and the general session in the afternoon following the luncheon, much important business was transacted, while in the evening, at the smoker given at the Commercial Club by Mr. Otto Luebker to members of the association and members of various government departments, there was a valuable interchange of ideas and expressions of opinion.

At the morning session of the board of directors, with Governor Robert P. Bass, the president, in the chair, there were also present Charles Lathrop Pack, of New Jersey; E. A. Sterling, of Pennsylvania; Prof. Herman H. Chapman, of Connecticut; Otto Luebker, of the District of Columbia; Chester W. Lyman, of New York; C. F. Quincy, of New York, and Frederick S. Underhill, of Pennsylvania. The minutes of the last meeting were approved, and the treasurer's report accepted. The finance committee, which is raising funds for the association, was continued and its report accepted. The auditors' report was received and other routine business was transacted preliminary to the general meeting in the afternoon.

The luncheon was served in the main ball-room of the New Willard at 1.30 in the afternoon, there being a distinguished assemblage of members and guests. The room was elaborately decorated with palms and greens and the tables with flowers, the general effect being most attractive. There were ten tables, seating eight each, and all were filled. An excellent luncheon was served and greatly enjoyed, and as soon as it ended Governor Robert P. Bass, of New Hampshire, the president of the association, called the general meeting to order.

Mr. Otto Luebker, the treasurer, outlined his report. He said in part: "The operations of the Association during the year ending December 31, 1911, show that, exclusive of voluntary contributions, our income met our expenditures within one hundred dollars. There is under way the raising of a ten thousand dollar fund to create a more ample working capital. The association has also been notified of a legacy of \$5,000 by Jane M. Smith, of Pittsburgh. The use of the income from this legacy is to be devoted to the creation of life memberships in the association."

President Bass appointed E. M. Griffith, of Wisconsin, Philip W. Ayres, of New Hampshire, and E. B. Grandin, of Pennsylvania, a committee on nominations, and this committee nominated the officers whose names appear in the first part of this magazine, and they were elected.

A committee on resolutions consisting of S. N. Spring, of Connecticut, Chester W. Lyman, of New York, and E. A. Sterling, of Pennsylvania, reported the resolutions elsewhere published, which were adopted.

Upon a motion by Mr. Kelsey, President Bass was authorized to appoint

a committee to investigate the question as to the advantages of state nurseries for the propagation, cultivation and sale of forestry material in competition with the business of private owners, and report at the next annual meeting.

Mr. Joshua L. Baily, of Philadelphia, presented a resolution relative to the chestnut tree blight, which was referred to the committee.

Amendments to the By-Laws which were adopted make changes providing that in the future, dues are payable upon election, and in each succeeding year upon the same date, and that officers of the association may hold the office also of auditors.

Mr. Luebker said: "As a fitting, though somewhat belated, testimonial to the memory of a former President of the United States, and a statesman who had done very much to foster the work along the line of forest conservation, I move that this association elect, as an honorary member for life, Mrs. Grover Cleveland."

This motion was greeted with applause and was carried unanimously by a standing vote.

Mr. J. L. Weaver, one of the newly elected directors, extended the welcome of the city to the visitors and expressed the city's appreciation of their presence.

The addresses by President Robert P. Bass and Mr. Henry S. Graves, Chief of the Forest Service, which were made during the meeting, appear elsewhere in this number, and the address by Dr. L. O. Howard, Chief of the Bureau of Entomology, will appear later.

Before the meeting adjourned, Mr. Charles Lathrop Pack, of Lakewood, N. J., a member of the board of directors, made a vigorous speech in which he spoke about the necessity of every member of the association working to aid the officers of the association, of going home and sending in half a dozen new subscribers and doing all in their power to advance the interests of the association.

After the general meeting, a meeting of the board of directors was held and routine work in connection with the duties of the directors was transacted.

In the evening over a hundred men assembled at the Commercial Club at the smoker tendered by Mr. Otto Luebker, treasurer of the association, and they had a most instructive and enjoyable time. A couple of hours were taken up in hearing short addresses about various features of the work of the association and in the interests of forest conservation, the addresses being by Governor Robert P. Bass, president of the association; Prof. H. H. Chapman, of the Yale Forest School, the moderator for the evening; Frederick H. Newell, Director of the Reclamation Service; F. H. Coville, of the Department of Agriculture; W. B. Greeley, of the Forest Service; William L. Hall, of the Forest Service; George Otis Smith, Director of the Geological Survey; J. G. Peters, of the Forest Service; Assistant Secretary of Agriculture Willet M. Hays; C. J. Blanchard, of the Reclamation Service; A. D. Hopkins, of the Bureau of Entomology; Overton W. Price, of the National Conservation Association; Commissioner Fred Dennett, of the General Land Office; Dr. David T. Fairchild, of the Department of Agriculture, and W. R. Brown, of New Hampshire.

After these talks, lunch was served and there was a general personal discussion of forestry and conservation work.

THE PROGRESS OF FORESTRY IN WISCONSIN

BY E. M. GRIFFITH
STATE FORESTER

The first forestry law of Wisconsin was passed by the legislature in 1903, but it was so loosely drawn that practically nothing could be done beyond setting aside some 40,000 acres on the headwaters of the Chippewa River as a nucleus for a forest reserve. In 1905 an entirely new forestry law was passed, its most important features being as follows:

1. The creation of an absolutely non-political State Board of Forestry.
2. The withdrawal from sale of all State lands in the northern portion, or timbered area, of the State, and the provision making all such lands part of the State forest reserve.
3. Giving the State Forester the right, after examination and upon approval of the board, to sell any State lands in the northern portion of the State, which either were found to be suitable for agriculture, or too scattered to be of value for a forest reserve, the proceeds of such sales to constitute a "Forest Reserve Fund," which should be used only for the purchase of lands to consolidate the reserves and for the improvement and protection of the reserves.

The passage of this act by including all State lands in the northern portion of the State, immediately increased the area of the reserves from 40,000 acres to over 300,000 acres, and through purchases of privately owned lands over 100,000 acres, at an average cost of \$3.00 per acre, have been acquired, so that the reserves today total some 425,000 acres, and prospective purchases will increase the total to about 475,000 acres. It is felt that satisfactory progress has been made in increasing the forest reserves from 40,000 acres to 425,000 acres in seven years, but Wisconsin has only made a good start as the State must have a reserve of at least 1,500,000 acres in order to protect the headwaters of the most important rivers; aid in supplying the wood-using industries with the timber which they must have, and to protect the beauty of the wonderful northern lake region that should annually bring millions of dollars into the State, through tourists, campers, hunters and fishermen.

The creation of the "Forest Reserve Fund" was a wonderfully wise move, as it has encouraged the sale and settlement of agricultural lands, and has given the forestry board a steady income with which to increase the reserves, and also provide for their protection and management. In order to further expedite the purchase of lands to block up the reserves, the legislature in 1911 made an appropriation of \$50,000 a year for five years, but this amount is entirely inadequate and must be largely increased.

What specific object has Wisconsin in view of creating her Forest reserves? The State is building up her reserves in some of the most northerly

counties, viz: Forest, Vilas, Oneida, Iron and Price, and within this area there is not only a wonderful lake region of over 1,200 lakes, but also the headwaters of four of the greatest rivers in the State, viz: the Wisconsin, Chippewa, Menominee and Wolf.

STATE FOREST POLICY

The State lands set aside for the reserves, as also the lands purchased, are not suitable for agriculture, being either too sandy, rocky or swampy, but these lands have grown some of the finest pine timber in the State, and all the young timber needs is protection from fire. The State forest policy then is looking to the accomplishment of the following points, viz:

1. The protection of extensive forests upon the headwaters of four important rivers. This together with the use of many lakes as storage reservoirs will tend to make the flow of these rivers unusually regular, thus preserving and even improving many waterpowers, which will become increasingly valuable, especially since Wisconsin has no deposits of coal.

2. Supplying the wood-using industries of the State with a considerable amount of timber, and thereby it is hoped keeping many of them within the State.

3. Preserving the forests in the beautiful lake region of northern Wisconsin will both protect and greatly enhance its present attractiveness as a resort region, for not only the citizens of the State, but of the entire Mississippi Valley as well. The value of such a resort region is not generally understood, even from the dollar view point, but the report of the bureau of labor of New Hampshire for 1905, shows that the resort business yielded in that year over \$10,000,000, and the report of the Forest, Fish and Game Commission of New York for the same year, states that it was over \$7,000,000.

4. The young timber on the reserves will be protected and denuded areas planted so that in future years the State will receive a direct and increasing revenue from the sale of mature timber.

If Wisconsin had been as wise as Canada and retained its timbered lands instead of selling them, the forester would have a going concern, and the timber would be his stock, which he would sell as it became mature, and thus be able to show a revenue at once. But Wisconsin chose in the past to sell its timberlands to anyone and everyone at a fraction of what their present value would be, and therefore the State must buy back the timberlands that it sold, only now thousands of acres have been cut over, and burned, and hence it will be many years before there will be much merchantable timber to sell. The bright side, however, is that much of the timber that was left is now, with increasing demands, becoming valuable. It is impossible to foretell what timber will be worth twenty-five or fifty years from now, but it is, at least, safe to say that it will be worth as much as it is today.

Taking into consideration the acreage of land within the forest reserves that contains virgin timber and that which is fairly well timbered, also the areas that contain only young growth and those that must be planted, it is not probable that in twenty-five years the State would receive a net revenue of over \$1.00 per acre, but at the end of fifty years this should have risen to

A PRIVATE CAMP IN THE FOREST RESERVE OF WISCONSIN.





BIG TROUT LAKE IN THE HEART OF THE FOREST RESERVE, WISCONSIN.

at least \$2.00 per acre. It should be explained that the revenue from fire-wood and all other forest products is included in this estimate, also the revenue from leasing camp and cottage sites, which will be very considerable. If then the State acquires a forest reserve of 1,500,000 acres, it should be able to count on a net annual revenue of \$1,500,000 after twenty-five years, and of \$3,000,000 after fifty years.

CREATION OF STORAGE RESERVOIRS

Wisconsin has adopted the policy of allowing river development companies under the most careful State supervision to use many of the lakes at the headwaters of the Wisconsin and Chippewa rivers as storage reservoirs, so as to hold and store up the excess or flood waters, and then draw upon the reservoirs in times of low water when the water powers upon these rivers are in great need of more power. No new storage dam can be built without the consent of the State Board of Forestry, and the board also controls the level to which the water may be raised or lowered, so that the beauty and attractiveness of these lakes for summer camps and cottages will always be carefully protected. With a large forest reserve surrounding these lakes and thus preventing the deep snows from melting too rapidly, and the lakes as storage reservoirs holding back the spring freshets, the streamflow of the Wisconsin and Chippewa rivers can be systematically regulated, and thus the water powers will gain enormously from a constant and even flow. Wisconsin has gone much farther than the other States in developing a definite policy looking to the full development of storage reservoirs and the forest reserves will always protect the reservoirs from silting up.

WOOD USING INDUSTRIES

In 1910 a study of the wood-using industries of Wisconsin was made in co-operation with the Forest Service, and the main points brought out in the investigation are shown in the following short summary:

Statistics covering the production of lumber and other products of the saw mill and woods of the United States are compiled and published annually by the bureau of the census in co-operation with the Forest Service. In 1860 Wisconsin ranked seventh in the list of States arranged according to the quantity of lumber produced. Ten years later fourth place was occupied, third in 1880, second in 1890, first in 1900 and 1904, second in 1905, third in 1906, and fifth in 1907 and 1908. For the last mentioned year, figures were furnished by 899 saw mills in Wisconsin, reporting a total production of 1,613,315,000 board feet, or 4.9 per cent of the total output of all the mills in the country. Though showing a decrease in production in comparison with the figures of the preceding year, 1907, Wisconsin retained its relative position among the States for production. The cut of white pine in the State has decreased largely in the last few years, though this loss in production has been offset by the increased output of hemlock and hardwoods. The State ranked second in the cut of white pine, first in hemlock, third in maple, first in birch, basswood and elm, fifth in ash, and second in tamarack in 1908.

In view of the position of the State as a producing territory, the reports of the wood-using industries should be of much value both to lumber manufacturers and lumber consumers. The figures given in the report indicate the volume of each kind of wood grown both in and out of the State which is used by wood-consuming factories. A comparison reveals the importance to the dependent industries of perpetuating the home supply.

Chiefly by reason of its proximity to raw material, its excellent shipping facilities by rail and water, its geographical position in relation to consuming markets, and the existence of skilled labor, Wisconsin assumes an enviable position among the States wherein wood forms a large part of the manufactures. An inquiry into the wood-using industries of the Badger State reveals the fact that more than 930 million board feet of lumber valued approximately at \$20,000,000 is utilized annually in the numerous lines of manufacture carried on. This is but part of the lumber industry of the State, as the figures given do not include the vast volume of material turned out by the saw mills as well as other forest products which are not considered as raw material for further manufacture. The value of the raw material only is set forth; were the labor expended upon it and the cost of other materials with which the lumber is combined, included, however, the total value of the finished products would soar into additional millions. Of the 930 million feet reported, a little more than one-half of that quantity originated in the State. The figures by no means represent the total amount of wood used, as finished products such as staves and heading used by the cooperage trade and complete wheels and gear used in assembling carriages and wagons were not included in the investigation. Neither was there included in the totals the heavy volume of lumber that goes into flooring, ceiling, siding, and other products of the planing mill.

As will be noted from the above summary, more than 930 million board feet of lumber valued at \$20,000,000 is annually utilized in the wood-using industries, and that already almost 50% of this lumber is purchased outside of the State. This means that in time the State will lose its wood-using industries unless the rapid destruction of the forests is checked. A State forest reserve of 1,500,000 acres can aid very materially in supplying this raw material, though the State cannot, and should not be expected to do it all.

THE FOREST RESERVE AS A SUMMER RESORT

The State Board of Forestry has adopted the policy of leasing camp and cottage sites upon the shores of the beautiful lakes within the forest reserve. Owning several thousand acres of land upon the shores of some of the most attractive lakes in Oneida and Vilas counties, the State is easily able to meet all present demands and can lease sites to suit almost any taste.

From ten to twenty acres will be leased to one person or family and as much more to a club or association as they may really need. Leases can be given for a period of twenty years with the privilege of renewal and the yearly rental will vary from \$10 to \$50 according to the size of the lot required, its location and the amount of timber upon it. The contract between

the State and the lessee is very simple, merely providing that the lessee will cut only such timber as is marked for cutting by the forester, pay the local price for such logs as he may use in building, use all possible care in building fires, agree not to sell liquor on the premises or to sublet without the consent of the Board. For a small additional sum, merely sufficient to cover the cost, the forest rangers will look after a camp or cottage during the winter months, or while the owner is away.

The Forestry Board, however, have no cottages to rent, nor can they build cottages or sell the building materials, except logs from the forest reserve. Cottage sites will be leased not only to residents of Wisconsin, but of other States as well.

The forest reserve region should become in time a great summer resort for people throughout the entire Mississippi Valley, as it has a fine bracing dry climate, pine forests and sandy soil and is blessed with many of the finest chains of lakes in the entire county. Vilas County in particular has a greater area of water than land, and long trips can be made by launch or canoe. There is plenty of sport for hunters and fishermen and the resorts furnish good beds and excellent board at reasonable prices.

It would seem that there should be many families in the State who would like to avail themselves of this opportunity to secure an attractive site upon one of the lakes within the forest reserves. The Board is anxious to encourage the best utilization of the forest reserves as far as possible, and it is believed that the forest reserve region, especially in Oneida and Vilas counties is far more valuable for development as a great resort than for any other purpose, and if this area is protected and every thing done to make it attractive, it will mean lasting prosperity for all the residents of that section.

As ex-President Roosevelt has so well pointed out, the National forests as well as the forest reserves maintained by the various States are intended for the fullest and best use consistent with their protection, and one of the most natural uses to which a portion of the reserves should be put is as game preserves for all kinds of wild game.

As stated, the forest reserves in time should be used very extensively as a summer resort and by campers, hunters and fishermen. Much of the attraction of the reserves will depend on whether there is good hunting and fishing, and if these are provided sportsmen and tourists will spend a large amount of money in the State.

Wisconsin propagates through its fish hatcheries many kinds of fish to stock the waters, but so far the State has done nothing outside of enforcing the game laws towards maintaining or increasing the supply of wild game. Now that the State has a forest reserve it would not entail a great expense to enclose, say, 10,000 acres within a game proof wire fence and authorize the **State Fish and Game Warden** to use such funds as are available from time to time in stocking it. The area to be enclosed should include lakes and forests so as to have favorable conditions for raising such valuable fur bearing animals as mink, beaver and otter, game birds such as partridge and pheasant, also white and black tailed deer and possibly in time moose, caribou and elk. As the game increased it should be distributed in all parts of the

forest reserves and in other parts of the State where is should receive adequate protection. The area of the game preserve could easily be increased when necessary and one or two forest rangers could easily look after the game and still be able to attend to a good deal of forest work. It is hoped that the legislature will authorize the State Fish and Game Warden and the State Board of Forestry to co-operate in establishing and gradually stocking a game preserve.

FOREST NURSERIES

In the fall of 1910, the site for a large forest nursery was cleared at Big Trout Lake, which is in the heart of the forest reserve in Vilas County. In the spring of 1911, the seed was sown in the beds and seedling count made in September, 1911, showed that the beds contained the following number of seedlings:

White Pine	460,992
Norway Pine	579,312
Scotch Pine	198,960
Western Yellow	89,376
Norway Spruce	98,832

Total seedlings 1,427,472

The entire nursery work has been done under the direct supervision of F. B. Moody, Assistant State Forester, and he has been very successful in raising strong, clean seedlings.

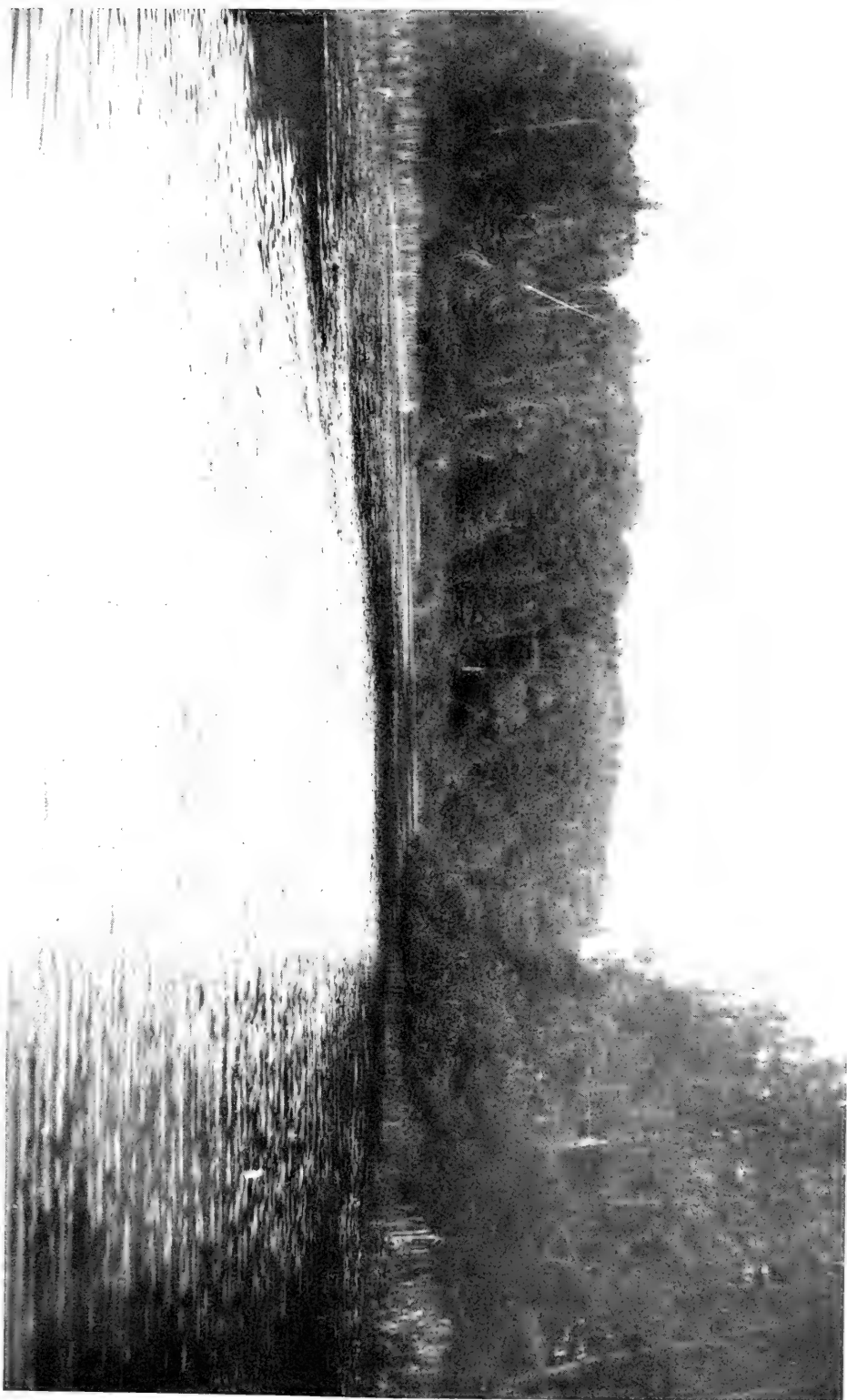
In May, 1911, the following transplants were purchased from the Forestry Department, Michigan Agricultural College, and set out upon denuded lands within the forest reserves:

White Pine	181,200
Norway Pine	1,000
Western Yellow	5,000
Norway Spruce	5,000

Total transplants 192,200

The Western Yellow pine has done remarkably well, the plants being wonderfully hardy, and grow so rapidly that it is hoped this species will prove well adapted to the climate of Northern Wisconsin. Another large forest nursery will be established near Tomahawk Lake in Oneida County, and it is expected that within a few years the State will be in position to sell plants at cost to individuals and companies that may wish to reforest their cut over lands, which are not restocking naturally.

The College of Agriculture of the University and the State Geological Survey are making a detailed soil survey of the northern and less settled portions of the State, and it is thought that when the areas of non-agricul-



A REMOTE SECTION OF THE WISCONSIN FOREST RESERVE WELL ADAPTED FOR A GAME PRESERVE.



NATURAL REPRODUCTION OF WHITE AND NORWAY PINE ON CUT-OVER LANDS IN WISCONSIN FOREST RESERVE.



16. TROUT LAKE, WISCONSIN, CONTAINS OVER 1,400,000 SEEDLINGS.

tural land are definitely determined that the owners will begin to seriously consider the protection of the young timber on such lands, and even planting them if this is found necessary.

FOREST RANGERS

In addition to cruisers who are employed in examining and valuing the lands and timber which are to be bought or sold, the board has a force of 12 forest rangers, who patrol the forest reserves to check the spread of any fire, and who are in charge of all improvement work in their respective districts.

The Forest Service, under the provision of the Weeks Law, has assisted the state during the past summer in protecting the forests upon the headwaters of navigable streams and 12 Federal patrolmen have been engaged in this work. Most of the rangers and patrols have had crews working under them and after heavy rains, when patrolling was not necessary, the work of building roads, fire lines and trails has been pushed as rapidly as possible, and through this work the timberlands, both state and private, are being divided into fairly small blocks, so that any fire can be held to a small area. The great number of lakes and streams within the forest reserve makes it a comparatively easy task to divide the timberlands into small blocks.

During the summer of 1911 over 78 miles of main roads were built on state lands and 32 miles on private lands, also 46 miles of fire lines on state lands and 40 miles on private lands. Twenty-five miles of telephone lines were constructed, dangerous slashings were burned on over 1,200 acres, and nearly all the old, dead stubs along the roads and fire lines have been cut.

Nearly all of the main roads have been built by utilizing old logging railroad grades. It is comparatively easy to remove and burn the old ties and then the grade is plowed and dragged with the result that not only is a good wagon road secured, but also a splendid fire line. Either houses or cabins are being built for all the rangers, and they will all be connected by telephone with the headquarters camp, and the nearest towns, so that in case of fire help can be promptly secured.

In addition steel look-out towers, from 40 to 60 feet in height, will be built on the highest points, and these towers will all be connected by telephone.

It is expected that most of the rangers will either have saddle horses or railway velocipedes in order to patrol their districts as rapidly as possible. Both the rangers and patrolmen have shown great interest in the work, and it is hoped that within a short time the University of Wisconsin and the forestry board will co-operate in establishing a forest ranger school, so that young woodsmen can be trained both for state work and employment by lumber companies, and large timberland owners as well.

UNLIMITED RAW MATERIAL FOR PAPER MAKING IN THE UNITED STATES*

BY CHESTER W. LYMAN

ABOUT the year 80 A. D., according to an ancient chronicler, there was a great commotion in Rome because of the scarcity of papyrus. The authors of that day apparently feared that both their contemporaries and posterity would suffer because of an inadequate supply of material on which to record their writings. The present apprehension on the part of some persons as to the inadequacy in the United States of a supply of materials for paper-making is equally groundless and in the eye of the paper manufacturer is absurd.

FORTY PER CENT OF PAPER NOT MADE FROM WOOD

There appears to be an impression that almost all paper is made from wood and that there is such a scarcity of this material that the prices of paper have become inordinate. The United States Census of 1909 shows that about 4,200,000 tons of paper were made in that year—of this fully 40 per cent was made from rags, old paper, manilla, straw and other materials than wood. To a considerable extent all these materials enter into competition with wood-pulp for use in paper-making. More or less of each kind will be used according to their cheapness relative to each other and to pulp-wood. So, too, do the paper products made from these materials compete to some extent with the paper products of pulp-wood. Of course, for some purposes only paper made from certain kinds of raw material will answer, but in general pulp-wood has no monopoly of the situation, and the use as well as the price of pulp-wood is determined partly by the cost of rags, straw, and various other raw materials. About the only class of paper that is made altogether of wood is news print paper, which is only 28 per cent of the total production of paper. This 28 per cent requires 1,600,000 cords of pulp-wood or only 40 per cent of the total of 4,000,000 cords of pulp-wood used annually in the industry. The other 60 per cent of the wood comes into direct competition with other raw materials for use in making a large part of the remaining 72 per cent of the whole production of paper.

GREAT VARIETY OF WOODS USED

Of the 4,000,000 cords of pulp-wood used in 1909 in making about 60 per cent of the paper of all kinds, 40 per cent was poplar, hemlock, pine, cotton-wood, balsam, white fir, beech, slab wood and mill waste, and various other kinds of wood than spruce, which constituted the remaining 60 per cent of the pulp-wood used.

*From *The Protectionist* for January.

As other kinds of raw materials compete with pulp-wood so do other kinds of wood compete with spruce. It is largely a question of the relative cost although, of course, adaptability enters into consideration. This tendency for one kind of wood to replace another is strikingly shown by comparing the use of other kinds of wood than spruce in 1900 and 1909 respectively. In 1900 miscellaneous woods were only 24 per cent, but in 1909 they were 40 per cent of the total consumption of pulp-wood. Thus spruce wood has no more of a monopoly in the field of paper-making than pulp-wood in general has over other kinds of fibres.

Of all the paper made, approximately 40 per cent is made from rags, straw, etc.; 20 per cent from miscellaneous woods, and 40 per cent from spruce.

Of the 40 per cent paper made from spruce about the only class which is substantially made entirely of spruce is news print paper. Assuming that all news print paper is made of spruce, it would take 1,600,000 cords or about 66 per cent of all the spruce pulp-wood used, so that 72 per cent of the paper made only requires about 33 per cent or one-third of the spruce used. As a matter of fact other kinds of wood could be substituted very extensively for this **33 per cent of the spruce used in making all other kinds of paper** than news print.

SPRUCE WOOD ONLY REQUIRED TO A LIMITED EXTENT

There is certainly no question as to the sufficiency of the supply of rags, straw, old papers, poplar wood, pine, hemlock, balsam, slab wood and mill waste, etc., of which 72 per cent of the paper is or could be made. The U. S. Department of Agriculture stated in 1908 that there are annually produced in the United States agricultural and industrial *wastes* suitable for making 35,000,000 tons of paper. It also said "practically all woods may be used for paper-making."

Thus the raw material problem resolves itself into the very simple question of the sufficiency of material for news print paper, *as at present composed*. It was assumed above that it is all made of spruce, but this is not strictly so. News print paper is composed, roughly speaking, of about 25 per cent sulphite pulp which is made from pulp-wood by a chemical process, and 75 per cent of ground wood-pulp which is made from pulp-wood by a mechanical process. Sulphite pulp used to be made almost entirely from spruce, but in recent years it has been found that hemlock, balsam, pine and several other kinds of wood make very good sulphite pulp, and 40 per cent is now actually made from such woods. There is very little doubt but that this 40 per cent will go on increasing and leave the spruce more and more for making ground wood-pulp. This is really the crux of the whole matter, as even today 54 per cent of the spruce used is made into sulphite pulp. Ground wood-pulp thus requires only 46 per cent of the spruce. This amounts to 1,124,000 cords per annum, and of this news print paper requires 1,000,000 cords, assuming that the ground wood-pulp is made wholly of spruce. In practice from 10 to 20 per cent of other kinds of wood are mixed with the spruce. Whether this percentage can be materially increased in future, as the result of

investigations now going on, is somewhat speculative, but it is not at all improbable that it can be; but under present conditions and those reasonably assured, the only question at all worthy of serious attention is whether we can continue to obtain 900,000 to 1,000,000 cords of spruce pulp-wood per annum at a price which will not unduly enhance the price of news print paper, or, in other words, the raw material for only about 24 per cent of the total tonnage of paper made.

PLenty OF SPRUCE IN THE UNITED STATES

Granting that we need 1,000,000 cords per annum of spruce pulp-wood, let us consider the sources from which it can be obtained. We are now using annually 1,650,000 cords of spruce cut in the United States, but it has been shown that through the availability of other woods, 650,000 cords of this is not absolutely required for the purposes for which it has been used. The same may be said of the 800,000 cords of spruce imported from Canada. The wide natural distribution of spruce in the United States is indicated by the statement in the Government's report on "Forest Products of the United States" for 1909—that spruce lumber, lath and shingles were produced in thirty-two states, the principal ones being in order Maine, New Hampshire, West Virginia, Washington, New York, Vermont, Virginia, Minnesota, and Oregon. Thus it appears that the North-east, Central-north and North-west groups of States are all represented. Spruce is found along the whole Appalachian range as far south as North Carolina. Conservation of this species over this whole area would insure an adequate supply for all time to come. Ten million acres averaging a stand of growing timber of 5 cords to the acre or a total stand of 50,000,000 cords with an annual growth of 2 per cent would yield 1,000,00 cords a year perpetually. There is today at least that area, that stand, that growth and yield in the State of Maine alone.

COST OF SPRUCE LUMBER AND PULP-WOOD NOT EXCESSIVE

By themselves the pulp mills would be no drain upon the reproductive capacity of the spruce forests, but consumption for lumber must be reckoned with. Of the total cut in 1909 of spruce for all purposes, about 32 per cent was pulp-wood. There is thus a competition between the saw mills and pulp mills, although at least 25 per cent of the wood used for pulp is not suitable for saw-logs, being tops and crooked and defective logs which would otherwise be wasted. Notwithstanding this double demand for spruce, although spruce lumber has advanced in price 50 per cent in the last ten years, this is not much in excess of the average advance in the price of all kinds of lumber, viz., 38.2 per cent, and it is exceeded by many common species, e. g., yellow poplar, 81 per cent; hickory, 64 per cent; ash, 51 per cent; cypress, 53.6 per cent; cedar, 52.9 per cent; cotton-wood, 74 per cent; western pine, 58.7 per cent. There is plainly nothing unusual in the increase in the cost of spruce with respect to lumber generally, or for that matter almost every other commodity. Most varieties of lumber compete with each other for many purposes and this tendency to substitute one kind of lumber for another is

a guarantee that there can be no inordinate advance in the price of spruce lumber without decreasing the demand and consequently the competition with the pulp mill. Further than this all the lumber has formidable competition in materials suitable for the same purposes, such as steel and especially concrete for building, artificial board made from waste wood, and coal for fuel instead of fire-wood (the greatest single item of wood consumption). The prevention of forest fires (said to destroy more than the axe) and conservative methods of forest handling will also be important factors in safeguarding the future supply of lumber and hence of pulp-wood.

CONSERVATIVE LUMBERING BY PAPER MANUFACTURERS

Paper manufacturers, owning timberlands, are almost without exception conservative in handling them. As a concrete instance, the case of the International Paper Company may be cited. In its fourteen years of existence it has cut on all its lands in the United States less than two-tenths of a cord per acre each year, which is not in excess of the natural growth. On its lands in Maine, New Hampshire, Vermont, and New York there is thus standing today fully as much timber as in 1898. In addition to this limited cutting it has established a nursery and has done considerable replanting of previously denuded or burnt-over areas and abandoned farms. In general, replanting is not necessary for reproduction, limited cutting being sufficient, and this is the prevailing practice not only with paper manufacturers, but others owning pulp-wood lands.

GREAT DECREASE IN PRICES OF PAPER

The real problem confronting the paper manufacturer is not whether there is an ample supply of raw material, but whether he can continue to meet the insatiate demands of the publisher for cheap paper if labor, pulp-wood, chemicals, machinery, and almost everything entering into the cost continue to increase. For the past ten years he has succeeded by improving methods and machinery in holding the price almost stationary. Some kinds of paper are actually cheaper. Notwithstanding the false impression created by the newspapers in their agitation for free paper, news print paper on the average is not 10 per cent higher than ten years ago. Some of the great dailies used to buy below the general market; prices are now more uniform, and because these publishers are treated like their weaker competitors they do not like it. In 1885 the normal price of news print paper was \$100 per ton, in 1890, \$60 per ton, in 1900, \$43 per ton, and in 1911 from \$43 to \$45 per ton. In this last decade the cost of labor in the mills and of pulp-wood have advanced at least 50 per cent and many other items only to a less degree.

PUBLISHERS ASK SPECIAL PRIVILEGE

In the endeavor to meet this ever-resounding clamor for cheap paper, our manufacturers of newspaper have for the past ten years been importing from Canada considerable pulp-wood. There are vast quantities over the

border and it is much cheaper in Canada than in the United States, both on account of the less demand compared with supply and because the Provincial Governments own the larger part of the timberlands and they sell the pulp-wood at a nominal price. This is known as Crown-land wood. As a matter of fact, most of the pulp-wood imported has come from private lands, but the competition of the Crown-land wood has heretofore fixed the price of the private-land wood. Canadian wood can be laid down at some of our mills a little cheaper than domestic wood—just enough to make it available. Only about 20 per cent of all our pulp-wood comes from Canada, and only a small part of this has been coming from Crown lands, so that the Canadian restrictions on the exportation of pulp-wood, which only apply to Crown-land wood, will not deplete our supply, although the result may be a slight increase in value.

VAST RESOURCES OF THE UNITED STATES STILL UNDEVELOPED

If no Canadian wood whatever were imported here, it would not jeopardize either our paper industry or our forests, provided we were protected in our market by a fair duty. Vast timberland areas throughout the Southern and Northwestern states, as yet unexploited for pulp-wood, would supplement our present domestic sources of supply. Under the stimulus of adequate protection many new varieties of wood would be demonstrated to be usable. Almost the whole vegetable kingdom—hundreds of fibres of plants and trees—awaits only the commercial incentive to be of service in making papers of all kinds. There is an everlasting supply of raw material in the United States. Less than 2 per cent of all the wood cut in the United States is pulp-wood, and yet, because at the present moment through a practical subsidy by the Canadian Provincial Governments paper made in that country can be delivered to our newspapers, if it pays no customs duty, cheaper than we can deliver it and pay American prices for labor and materials, our politicians, at the behest of the publishers, seem ready to turn over the industry to Canada on the specious plea that we lack the raw material here at home. Half of our various industries would be blotted out if the same fallacious argument prevailed generally.

TWO FEATURES OF FORESTRY

The part that Colleges and Experiment Stations may play in its Development

FROM A PAPER READ BY F. W. RANE, MASSACHUSETTS STATE FORESTER, BEFORE
THE ASSOCIATION OF COLLEGES AND EXPERIMENT STATIONS AT COLUMBUS, OHIO

TAKE it for granted at the outset that forestry is already acknowledged to be a subject worthy for consideration by our colleges and universities and well adapted for a place in their curriculum; also that experiment station officials feel that were they able to enlarge their staff by the addition of a forester, results could be expected in this line of agricultural development in their respective states.

Forestry is nothing other than an agricultural crop which demands modern methods of culture and management, as other plants, for both economic and æsthetic results. The forest crop or forestry at once calls to mind a large class or group of plants of the vegetable kingdom whose fundamental importance to a State or nation is necessarily closely related with its success and progress. Wood or lumber finds innumerable uses.

When our forefathers came to these shores, they found magnificent primeval forests in all their glory—a vast field of grain waving before the wind as it were. Individual specimens of white pine in New England, Michigan, Wisconsin and Minnesota; Black Walnut in Ohio, Pennsylvania, West Virginia, Kentucky; Black Cherry throughout the eastern United States; Chestnut, Massachusetts to Georgia; Tulip Tree, throughout the Appalachian Range; all these and many more species could be found that would cut upwards from three to six thousand feet board measure from a single tree. What has become of these Monarchs of the forest? Today we point with pride to the forests of the great west and northwest which still remain, but how long will these forests continue to stand judging from the wasteful methods of the past? Because the East wasted its birthright, now the West claims similar privileges.

We have possessed a nation flowing with milk and honey, figuratively speaking, streams teeming with fish, precious minerals, coal, oil and natural gas in abundance, wild animals and game of a large variety, forests nearly everywhere excepting on the rich prairies, soils adaptable for most any kind of crops, etc., and what have we accomplished with this heritage thus far? We have built and established a nation great among the nations of the world. This we Americans are proud of and we have every reason to be, as our record shows. It was but yesterday our ancestors arrived here and today, we are a world power—in point of time but a brief minute compared with the lives of nations.

In the development of the nation, we have not wanted for natural resources; they have been awaiting our use. To an intelligent audience of scientifically trained men like this it is unnecessary to paint any word picture of our development; to simply ask you to give the subject consideration is to call its evolutionary history to mind.

Presidents, directors and workers generally, who have coöperative interests in this organization, all realize from their life's work the importance of economic utilization and conservation. There is undoubtedly no force that has met our nations needs and furthered her real fundamental development of permanency than the work of the institutions represented in this organization.

At the recent National Conservation Congress held at Kansas City, I was particularly impressed with the fact that the men that that organization now falls back upon for permanency are largely the product that is the outgrowth of the work of the Land Grant Colleges and Experiment Stations. Conservation of Natural Resources is a phrase which has sprung up like a mushroom in the night and has emphasized through its popularity and significance what appeared at the time a new idea. This sudden culmination, however, was made possible through the educational conditions that have been constantly at work during recent years together with the psychological time in the nation's development.

RESTORATION VS. CONSERVATION

In presenting the report from Massachusetts at the recent Conservation Congress, I took the liberty of discussing briefly the following "Restoration vs. Conservation of Natural Resources," and as it is more or less applicable, I beg your indulgence in repeating a part of it:

Restoration vs. Conservation of Natural Resources.

"In Massachusetts the work of restoration is even of more importance than conservation when applied to forestry. The annual cut of our forest products at present amounts to only five per cent. of that used each year throughout the Commonwealth for manufacturing, building and other purposes. Surely we can and ought to supply a larger amount of our own home grown woods. Although the State has been well cut over, even now our present wood harvests play an important factor in the industries of many of our rural sections. While, we believe thoroughly in conservation where it will apply, still the more potent force here begins farther back. We need to teach the A B C of restoration in Forestry. When our work of reforestation shall have begun to demonstrate its value, it will be an object lesson, which will mean much toward perfecting a better state forest policy."

Practical forest restoration, therefore, is what Massachusetts needs most. If we will reconvert our hilly, rocky, mountainous, moist, sandy, and waste non-agricultural lands generally into productive forests, the future financial success from rural sections of the Commonwealth is assured. This is no idle dream; it can be accomplished. Massachusetts is a natural forest country and all that is needed is simply to assist nature, stop forest fires and formulate constructive policies. Then we can grow as fine forests as can be found

anywhere. Germany and many of the countries of the old world have already demonstrated what can be done. Are we to be less thrifty and farsighted? Americans do things, when they are once aroused, and it is believed that reforestation and the adopting of modern forestry management must be given its due consideration in this State from now on.

The writer has been delighted in following the interest that has been aroused and the great tendency for all our people to not only welcome and appreciate the new idea of "Conservation," but to even credit the term or phrase, as covering every phase of new endeavor.

It is not my purpose to lessen the glory one whit, or bedim a single gem in the crown of the national phrase "Conservation of Natural Resources," nor could I were it to be tried, for the heralded motto has already stamped itself firmly upon the nation.

As time goes on, however, it will be found that our popular phrase will not carry with it the whole panacea of overcoming our wasteful and depleting conditions, and that new and equally applicable terms though perhaps never so popular, will come to express more aptly our real needs.

To my mind the phrase "Restoration of Natural Resources" vies with that of "Conservation of Natural Resources" and expresses a force to be aroused in the nation for good that in many ways surpasses the present popular one.

We have our forest reserves and minerals that are left, and now to conserve them economically is a worthy undertaking, but in the older sections of the nation to conserve what we have in depleted and worn out lands and forests is to pick the bones of the withered and shrunken carcass.

Let conservation apply where it may, but the force that is needed in Massachusetts and all of New England, yea, the South, extending even well into the middle of the nation, following the great depleting agricultural cereal and cotton crops on the one hand, and the lumberman's axe and forest fires on the other, is greater than this term can begin to express.

The term "Restoration of Natural Resources," I claim, meets our present needs far better and breathes greater hope and definite accomplishments for our children's children in the future.

GROWING AS WELL AS HARVESTING

Forestry, although it is an agricultural crop and must have greater consideration in the future, has not received the attention it deserved until practically the present time. Forest products have been relatively abundant and cheap in nearly all sections of the nation. Suddenly our needs began to outstrip the supply and then with advancing prices lumbermen and the public generally have gradually awakened to the necessity of providing for our present and future needs. We find that it is not only a question of harvesting the crop from now on, but one of growing it. There has been little demand for educated foresters in the past as the undertakings were mainly those of economic methods of lumbering.

Saw logs in the early days were 16 inches in diameter or more, while today with us in New England lumbermen consider the 5 inch saw log of

equivalent value. Box boards usually cut from white pine regardless of size of the log or gnarliness of the tree, with wany edges and the bark still adhering, bring more money today than did square-edge, clean, clear stock not many years ago. A prominent Boston timber cruiser, who has spent the past few years throughout the South, called at my office within ten days and his version of the depletion of the natural forest products of that section was really amazing.

To my mind there are few subjects wherein the organizations represented at this association need to participate more actively than that of forestry. Just because there has not been a definite demand and apparent need until now is not an excuse for present lethargy.

The older members of this association can well remember the earnest and farsighted appeal made to this body by the late Samuel B. Green, of the University of Minnesota, Department of Forestry. Professor Green was particularly anxious that the Government be called upon to enact a law whereby each State should have a definite appropriation yearly for carrying on forestry work. The idea was carried as far as presenting the matter before Congress H. R. 9219, and known as the Davis Forestry Bill. The bill called for an appropriation of \$5,000 by the National Government on condition that each State appropriate a like sum. Professor Green said, "when we think of the enormous value of the forest output of this country, the amount requested to educate young men to be competent to take care of this forest wealth, seems trivial indeed. I do not wish to see all the agricultural colleges attempting to turn out professional foresters, and such would not be the effect of these proposed expenditures; but the result would be that in a short time we would have a surplus of young men well trained in the basic principles of forestry, through whose efforts the forest sentiment of today would crystalize into a permanent and helpful thing."

Do we realize that this plan carried out would mean an expenditure of only \$250,000 a year from the National Government and as well furnish an incentive for the States to take advantage of the assistance. This would result in placing the work on a progressive foundation at once.

For some reason, we did not take to the idea enthusiastically. There is no legitimate reason even now for not using our present governmental funds for this work, but this might cause necessary adjustment and financial complication. Consequently we have been prone to let well enough alone.

A DEFINITE POLICY IS NECESSARY

One thing is certain, we are losing valuable time in not having a more definite and well defined policy of development for forestry throughout the Nation. While here and there our most progressive states are doing something in forestry work which example is worthy and is gradually being followed by others, nevertheless, we are one people and a fundamental industry so important to the nation's welfare should enlist all educational leaders of rural economics in its behalf.

Economically the forest crop of the future must play a very important part. Those of you who have not had time to study it, may be interested in knowing its importance to even a small State like Massachusetts. We have in Massachusetts approximately 5,600,000 acres of land and of this acreage three-fifths, or practically 3,000,000 is unadapted to tillage or general agriculture. These lands, however, under management can all be devoted to forestry. Upon a single acre of such land, we have demonstrated from a thorough study of the white pine that we can grow 40,000 feet board measure in 50 years, or an average of 800 feet per year. As stumpage is worth from \$6 to \$12 a thousand at the present time this would mean an average annual income of from \$4.80 to \$9.60. Were it possible to practice modern forestry management therefore, over our entire 3,000,000 acres of forest lands in Massachusetts it would mean an annual income of from \$14,400,000 to \$28,800,000. These figures may seem very startling at first, but I offer them for your deliberate consideration. Please remember that the above figures are based on present prices in Massachusetts and I am willing to leave it to your judgment, whether future prices are not likely to be even higher.

What is true of the growth of white pine in the old Bay State is more or less true of forestry conditions elsewhere. When we consider stumpage prices, we must consider also that these conditions realized, mean economic employment of manual labor, teams and machinery, together with the saving of transportation on raw material and the giving of employment to rural sections during the winter resulting in an all year round occupation.

While Massachusetts does not typify every State it exemplifies that forestry and forest products demand our consideration.

The United States Forest Service has done and is doing splendid work which is having desired results and many States have well organized departments of State Forestry, but it remains for this association through its present splendid organization to become more elastic, welcoming the necessary extension of its curriculum and investigations to include forestry.

I believe that every State should have its State Forester whose whole time can be spent in determining and carrying out a definite State forest policy. Fire protection and regulation, reforestation and general modern forestry management need constant State supervision and encouragement.

EDUCATION OF THE PEOPLE

With a National and State organization perfected the only thing lacking is the great assistance that must come from educating the rank and file of our people who are to own and manage these forest lands. There are no institutions to which this work more naturally falls than to our Land Grant Colleges and Experiment Stations. Already these institutions are doing for our people everything possible in every other line of agriculture; then why should not forestry be included along with horticulture and agronomy? The department of Botany necessarily teaches the fundamentals of the science and with little additional equipment and assistance any botanical department could give a course in forest botany. What is true of botany is equally

true of entomology, physics, plant pathology, etc. Again, I firmly believe that forestry should be required in the agriculture courses to a point sufficient for a comprehensive knowledge of it, allowing students opportunities to specialize later on.

The principles of forestry can readily be taught in our short courses and elementary schools provided the fundamentals of botany, soils and nursery work precede the same. But here again this is made possibly only through competent teachers, the product from the Land Grant College or similar institution.

Please do not understand me as an advocate of more forestry schools, which endeavor to educate the so called technical forester as I believe we have probably enough of this class of institutions already, but that there is a great and growing need for a general forestry education sufficient to practicing modern methods, I am certain.

In Massachusetts again, I believe we have the ideal arrangement. The State Forester has immediate charge of the shaping and carrying out of the State Forest policy. The State Forester also gives lectures yearly at the Agricultural College covering his field of work. The Massachusetts Agricultural College has a Professor of Forestry whose privilege it is to see that all students are taught a working knowledge of the subject. Where certain students have shown special proficiency in forestry they undoubtedly upon graduation may secure credits in forestry schools, but the college does not claim to turn out a technically trained forester.

By this system of organization, I am convinced that very satisfactory results can be realized. There is certainly plenty of work for a State Forester to accomplish without his being tied down to teaching or doing much research work. His work compels him to be familiar with the general State conditions, and the administration of field work in forestry management, reforestation, nursery work, forest insect and disease depredations, the care and management of State forest reserves, forest fire protection, etc. The handling of the forest fire problem alone requires a great amount of supervision to get satisfactory results. The installation and management of lookout stations, the work of securing modern forest fire fighting equipment for towns and townships, and keeping it properly housed and cared for so as to be effective, for proper efficient patrol systems in dry times; all these demand constant attention. To keep a forest fire system effective the State Forester must be in close touch with the working unit. What is true of forest fires is equally true of seeing that forest working plans are properly executed and that all forestry practices are performed in a practical way.

It therefore, remains for the Professor of Forestry to do the teaching of students and the Station Forester or the Station Botanist, Entomologist or Pathologist to undertake the lines of pure investigation. With this definitely outlined plan results are bound to come.

In closing, I simply desire to appeal to this association in behalf of a more wholesome position than we have yet reached in recognizing forestry or the forest crop as needing and deserving more attention than we are at present giving it.

CONVENTION OF FORESTERS

THE fifth annual convention of the Pennsylvania Department of Forestry will be held at Harrisburg on March 5, 6 and 7, and a very interesting program has been prepared. It is as follows:

Tuesday, March 5. "THE FORESTER AND HIS COMMUNITY." Morning session, 10.30 o'clock.—Addresses of Welcome, by Hon. John K. Tener, Governor, members of the State Forestry Reservation Commission and visiting friends. 1. The favorable or unfavorable attitude of the community toward forestry. (a) The reasons for this attitude, A. C. Silvius; (b) How may causes leading to an unfavorable attitude be removed or ameliorated, Alfred E. Rupp.

Afternoon session, 2.30 o'clock.—2. The attitude of the forester toward his community. (a) The reflection of his attitude toward his rangers and employees, Raymond B. Winter; (b) His contact with the community—(1) His attitude toward his work, Tom O. Bietsch; (2) Interest and help in matters outside his work, Harry E. Elliott; (c) The results of reaching school teachers and pupils, R. Lynn Emerick. Evening lecture 8.15 o'clock, House Caucus Room, Capitol.

Wednesday, March 6. "FOREST UTILIZATION." Morning Session, 10.00 o'clock.—1. The importance of an early removal of dead and defective trees. (a) Protection at a profit, William F. Dague; (b) More rapid regeneration and growth, T. Roy Morton; (c) Early returns and their effects on the investment, Prof. E. A. Ziegler; (d) How clearing may be done with least expense to the Department, Harold E. Bryner.

Afternoon Session, 2.30 o'clock.—2. Impossibility of utilization without knowledge of markets and specifications. (a) Importance of obtaining detailed local information by each forester, John A. Bastian; (b) Assistance of Department, James E. McNeal; (c) Department a clearing house with reference to these matters, George H. Wirt. 3. Detailed record of cost of marketable forest products under varying conditions, Lewis E. Stanley. 4. The relation between roads and markets. (a) Study of markets before road development, Harry A. Thomson; (b) Sylviculture dictated by road conditions, Forrest H. Dutlinger.

Thursday, March 7. "MANAGEMENT." Morning Session, 10.00 o'clock. 1. Study of Plantations. (a) Expedient methods of reforesting wholly or partly deforested areas, Hon. S. B. Elliott; (b) Protection of plantations, John W. Seltzer; (c) Importance of careful plantation records, Prof. I. T. Worthley; (d) Records and protection of plantations in foreign countries, George A. Retan.

Afternoon Session, 2.30 o'clock.—2. Business methods in forestry. (a) Forest reserves a State investment, John L. Strobeck; (b) An immediate or future profit for each operation, Homer S. Metzger; (c) The importance of detailed records from the beginning of operation, Prof. Joseph S. Illick; (d) Scientific management in forestry—(1) Combination and concentration of abilities and resources, Walter D. Ludwig; (2) Scientific study of operations, John R. Williams; (e) Outline for uniform reports by foresters, D. Kerr Warfield.

THE AMERICAN MENTAL ATTITUDE ON CONSERVATION AND ITS GROWTH

By BOLLING ARTHUR JOHNSON

MR. R. S. KELLOGG, who has written much and practically, on forestry matters, believes that efficiency and coöperation will be the key notes of future success; that only by efficiency in the details of production is it possible to decrease cost and improve quality; that only by frank and hearty coöperation between producers is it possible to maintain the equilibrium between supply and demand, to avoid the waste and destruction to which unlimited competition inevitably leads; that no lumberman wastes because he wants to buy; that all have wasted because there seems to be no other way to do; that just as long as operations are conducted on the present plan, the present waste will be inevitable, and that coördination in manufacture is necessary.

The conservation movement has gone forward like a lambent flame across the ground, as Kipling describes the wizard speed of a certain polo player of India.

Efficiency methods in the running of all lines of business, the feeling that it is as criminally careless to waste a piece of wood as it is to toss a loaf of bread into the street, will have to become a mental attitude in the United States before the idealists, the so-called "Forestry Dreamers" shall have been satisfied or should be satisfied.

That very attitude, too, is beginning to show in many ways. While lumbermen as a class have not indorsed the forestry movement, they are not to be arraigned on the subject, for they have gone much further in the direction of the adoption of proper forestry methods than has the great general business public gone forward in endorsing the methods of efficiency as preached by that apostle of Scientific Management, Frederick W. Taylor.

Mr. Taylor is more generally misunderstood by the rank and file of business men today than is forestry by the average lumberman. This fact was well illustrated only a few days ago by the remarks of a high class, careful business man who had recently attended a great banquet given by a great business association which Mr. Taylor had addressed, no doubt scientifically, and this man was really bored by what he had heard and by what he had seen and he thought that many others were also bored by what they had heard and seen. This gentleman went so far as to make fun of the great man's endeavors to illustrate his ideas by drawings and was quite insistent that "Nobody could tell *him* about *his* business." Now that is the attitude of the average American about anything. He has not yet become fond of being taught how to manage his affairs from the printed page of books simply because he has not yet reached the first form in the grammar school in his education as a "Citizen of the World."

All indications show, however, that when he does go forward along new lines of thought, he will go like Kipling's polo player, like his trains travel, like he does business generally, like he goes when he fights as a bull or a bear in the wheat pit.

Conservation and all its kindred "isms" has taken hold of the American mind more than sporadically,—it is really assuming constitutional activity.

Jolting out to the lumber district a day or so ago in a rather smelly and not nearly up-to-date car in this great western metropolis of Chicago, I overheard a remark to show that the idea of efficiency in management has filtered down a long way. Two young railroad men were talking. They may have been switchmen and were sooty and dusty with the grime of their labor, but their eyes were bright with health, and while their pronunciation was very much "Chimmie Fadden," they talked with intelligence, if not with elegance.

A butcher's wagon had stalled so that a wheel almost grazed the car. The name of the butcher had been beautifully painted on the side of the meat delivery bus, and it was large, attractive and noticeable, but to the average man it was only a name, but to one of these young railroad men it was something else and he said:

"Say, Bill, ain't dat de name of de guy wot told all the railroad brass collars how to save a million dollars a day in running de roads?" It was a similar name—Louis Brandis.

Having reason recently to go out into the length and breadth of the literary realms of this country to secure articles on wood waste efficiency, conservation, and all those cousins of the forestry movement for publication in a lumber newspaper soon to be launched in the West, I was surprised by the number of high class people who knew what was wanted and caught at the spirit of the thing at once and offered to write reams and reams of publishable stuff that I only feared could be gotten in such niggardly quantities that the assembling of it would be difficult. This was borne in on me early in November when I met an old friend, an advertising man, whose real business is advertising signs, putting up those odd and awful things that direct people to somebody or another's soap, or declare by winking lights that someone's automobile is the only one on which the wheels are really round.

At all events, I never had any right in the world to imagine that this most interesting friend of mine was a possible contributing editor.

But he was.

Something was said, of course, about the subject of most interest to me and this great big forceful American, the engineer of the blinking lights, leaned across the table, in the buffet smoker on the train and long after even the porter had gone to bed talked of a summer that he had spent with the Over Forester in the Great Black Forest in Baden Baden, and of the times when the trees were to be sacrificed and the preparations that were made for taking down those trees that had ripened and of the old women and the boys and girls who always gathered about eager for the privilege of gathering up every little twig and limb in order to carry it away and use it. It was a pretty story and it will appear some time in the column rules in extended form.

We, who love trees sentimentally, but who wish to use them as they were intended to be used, should not feel in the least pessimistic on account

of the apparent slowness with which the lumbermen as a class have assimilated forestry methods and ideas. The few people who are really in earnest in the matter of forestry are great big forceful men standing on the hill-tops of the lumber world and it is natural that it should be so. The rank and file are coming along in the direction of a full indorsement of these methods, just as swiftly and more swift, as among lumbermen as a class, than the great public is moving, as indicated by the remarks of the young railroad man made about Mr. Louis Brandies, whose name he saw on the butcher's cart.

FORESTS FOR WYOMING

BY HON. JOSEPH M. CAREY

GOVERNOR OF WYOMING

I BELIEVE everything in reason should be done by the general government, by the states and the several counties of the states, to protect the forests of the country; that wherever it is possible there should be seed planting and tree planting, with a view of growing forests where it is possible to grow them, or where the former forests have been destroyed. This can only be done successfully in a dry country—and Wyoming may be said to be one of the arid states—where there is a little moisture, or where the trees and plants may be fed moisture from irrigation canals and irrigation systems.

By actual experience it has been found that where certain kinds of trees may be artificially watered, they grow rapidly in a comparatively short time to such a size as would make railroad ties or ordinary building lumber. To illustrate: Wherever a ditch or canal is cut in this country and there is any protection whatever from the winds, trees spring up rapidly from the seed borne on the waters of the irrigation ditch. The late Sterling Morton, who did so much for tree planting in this country, said that in this prairie country trees should be planted on the ground not needed for rights-of-way, for ordinary farm roads and railroads. He even went so far as to say that in a very short time, by the planting of certain varieties of trees, that railroads would have near at hand a supply of lumber to meet their annual demands for railroad ties.

Wyoming has some good forests, and in most instances the plan adopted by the government is followed, in that only the mature trees and those approaching a condition of decay may be cut down, with all precautions being taken to destroy the refuse and avoid fires. The only objection to their system is that the government has included within its various reservations, large areas without lumber and lands that they do not expect to try to forest or reforest.

I go so far as to state that I think if the great white pine forests of Minnesota, Wisconsin and Michigan—probably as valuable as ever has been discovered—had been protected by the cutting of the decayed trees and protecting the young growth, that these forests would have lasted for all time. They are gone, however, or virtually so, and the question now is to see what can be done to supply their places and to protect the other great forests that exist within the domains of the United States.

AMERICAN FORESTRY ASSOCIATION RESOLUTIONS

AT the annual meeting of the American Forestry Association in January the following important resolutions were presented and adopted and copies of them were sent to each United States Senator and Congressman and to the Governors of all the States and Territories:

RESOLUTION NO. 1

Whereas, the Weeks Act provides an appropriation of \$200,000, available until exhausted, to enable the United States Government to co-operate with states in protecting from fire the forested watersheds of navigable streams, and

Whereas, the experience of the past fire season has demonstrated the effectiveness of such co-operation in reducing the damage caused by forest fires,

Be it Resolved, That the American Forestry Association urges upon Congress the continuation of appropriations to be available annually for this purpose, and

Be it Resolved, That a copy of this resolution be sent to the members of the Senate and the House of Representatives.

RESOLUTION NO. 2

Whereas, an equitable system of forest taxation is one of the essential fundamentals for the practice of private forestry and as little progress is being made in providing a tax basis which will not put a premium on the cutting of timber, be it

Resolved, That the American Forestry Association recommends action by the executives and legislatures of all forested states towards the enactment of legislation which will encourage timber production both by the long time management of existing forests and the planting of new forests, and we recommend to this end that the taxation of forest lands be placed as fast as possible under state control, and be it

Resolved, That copies of these resolutions be sent to the governors of all states concerned.

RESOLUTION NO. 3

Whereas, a virulent fungus disease known as the Chestnut Tree Blight has already infected a large portion of the region wherein the wild chestnut tree is a native, and threatens the destruction of this valuable timber tree throughout its range in the United States; and

Whereas, the great body of wild chestnut in the New England States, in New York, New Jersey, Pennsylvania, and Maryland has been reached by this infection, and vigorous efforts are required to prevent its further spread into the states of Delaware, Virginia, West Virginia, Ohio, Indiana, Michigan, North Carolina, South Carolina, Kentucky, Georgia, Tennessee, and Alabama; and

Whereas, the states not yet reached by the infection are justly entitled to every possible help and protection which Congress and the states themselves may be able to employ in saving their chestnut timber from attack; therefore, be it

Resolved, That the American Forestry Association pledges its support in arousing the public to combat this disease.

Resolved, further, That the American Forestry Association strongly urges the members of Congress to support a bill now pending before that body appropriating \$80,000.00 for the use of the United States Department of Agriculture, to be used in a thorough study and investigation of this tree disease, with the view of devising ways and means to combat its further spread, and to subject it to possible control, and urges the executives and legislatures of the states named above to take measures to check the spread of the disease.

Resolved, That a copy of these resolutions be sent to each member of the Senate and House of Representatives in the Congress of the United States, and to the governors of the states concerned.

RESOLUTION NO. 4

Whereas, there are now over 14,000,000 acres of private timberland in co-operative fire protective associations, and

Whereas, experience has shown that these associations have been effective in materially reducing the damage caused by forest fires on their own and contiguous forest lands, be it

Resolved, That the American Forestry Association recognizes the great value of co-operative fire protection and most heartily commends the public spirited action of the associations already formed and strongly urges the timberland owners of all sections of the country where fires are serious to avail themselves of the benefits to be derived from such co-operation, and be it

Resolved, That a copy of these resolutions be sent to all such associations now in existence and to all lumberman's associations who do not co-operate for fire protection.

RESOLUTION NO. 5

Resolved, That it is the duty of state governments to encourage the practice of forestry by private owners and that the most effective means to this end are efficient fire protection, education, and state forests, and reform in forest taxation.

That it is necessary, in order to secure an effective system of fire protection that a state system of control and inspection be perfected, supplemented as far as possible in dangerous regions, by state patrolmen employed continuously throughout the danger season.

That in this connection states be urged to co-operate with the national government under the Weeks law by establishing a system of patrol sufficiently effective to enable them to secure a proportion of the congressional appropriation for this purpose.

That the educational efforts of states should take the form of popular lectures, professional advice to timberland owners and short courses of instruction in state institutions.

That states should acquire land for the establishment of demonstration forests and experimental areas and that in no other way can forestry be so effectively advanced as by the actual practice of forestry by the state governments.

That states should acquire large tracts of land unfit for agriculture either because of its mountainous or sandy character, and should devote it to growing timber, as a matter of state economy.

That the forestry work of states can be best conducted by technically trained foresters with practical knowledge of conditions, and that it is of vital importance that the forester's office be entirely free from political influence

FORESTRY DEPARTMENT FOR UNIVERSITY OF IDAHO

BY the action of the lumber and timber interests of northern Idaho the University of Idaho will soon have one of the best equipped forestry departments in the United States. \$58,000 was voted at a meeting of the Northern Idaho Forestry Association held in Spokane to consider the question of prorating the timber holdings of the members of the Association to raise funds for the erection of a Forestry building at the University of Idaho. President MacLean and Dean Carlyle were present and outlined the work and future problems and possibilities of the Forestry department. Dr. C. H. Shattuck, head of the department, explained his work in seeking commercially profitable processes of handling the by-products of the lumber industry. Realizing that only scientific investigation can discover such processes, the lumber and timber men of northern Idaho voted the money needed to enable Dr. Shattuck to carry on his investigations.

"Sawed products," said Dr. Shattuck, "represent less than forty per cent of the total products of the tree. The lumberman needs the help of the scientist in finding ways of utilizing the sixty per cent. In Europe the by-products are often more valuable than the lumber products. Among the valuable by-products of our western woods for which there is an increasing demand are: ethyl alcohol, thirty-four different kinds of paper, turpentine, rosin, creosote, shingle stain, fir balsam, oils of various kinds, pyroligneous acid, acetic acid, tannic acid, sugar, tar, pitch, charcoal and coke."

"The lumber manufacturers of the Northwest have failed to utilize these by-products, not from choice, but through necessity. It is the purpose of the University of Idaho to co-operate with them and to carry on experiments to devise methods of extracting in the most economical manner the by-products from the woods of this region, and also to discover uses and markets. This part of the work will be put in the hands of an expert industrial chemist. In addition to these lines of work, we intend to conduct high-grade courses in Forestry, with laboratory courses in lumbering and secondary wood-using industries, and also a strong course in logging engineering."

The tentative plans for the Forestry building, upon which Dr. Shattuck has been working for some time, call for a three-story building, with a one-story annex for a practical saw-mill and wood-treatment laboratory. There will also be a basement to contain the forestry-pathology department.

The main portion of the building in the tentative plan is to cover 60x100 feet. On the first floor will be the library, a suite of offices, draughting rooms, a museum, an auditorium and the wood distillation laboratory.

The second floor will have lecture rooms, the wood-structure laboratory and the herbarium and dendrological laboratory. On the third floor will probably be offices and research laboratories.

In the saw-mill there will be one working floor, with a filing room above. On the working floor will be the timber testing laboratory to test the strength of timbers, the wood-products laboratory for making boxes, shooks, etc., the wood working machinery, a band saw, the motor and boiler, trimmers and grading tables, a re-saw and edger, a dry-kiln, the timber preservation laboratory, with vats for both open and pressure processes, and a small pulp mill. The mill will be run by machinery.

The building will be erected in the near future, as both the school authorities and the lumber and timber men are eager to have the work begun as soon as possible.

QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

THE CHESTNUT TREE BLIGHT COMMISSION

IN nineteen hundred and eleven the Pennsylvania State Legislature passed a bill authorizing the Governor to appoint a Commission of five citizens for the purpose of thoroughly investigating the Chestnut Tree Bark Disease which is rapidly destroying the chestnut trees of the Commonwealth. The Act placed an appropriation of \$275,000 at the disposal of the Commission for the investigation and scientific study of the problem, and more specifically to ascertain the exact extent of the blight, and to devise ways and means through which it might, if possible, be stamped out.

The Commission was appointed in June, 1911, and, after organization, began its work immediately by sending a large force of experts into the field. The reports of these experts together with the results of the work of the pathological staff, will, among other matters, be presented for discussion to a Convention called by the Governor to assemble at Harrisburg, Pa., February 20th, next.

In order that the other States not yet touched by the blight, but certainly in its line of advance, may realize the seriousness of the situation, the Governor, who is much interested, has called this Convention for a consideration of ways and means, in the hope that the States may be aroused to action and be ready to meet the invasion at their borders. Pennsylvania's problem is now or soon will become the problem of Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, Tennessee, Kentucky, West Virginia, Ohio, Indiana and Michigan. Active co-operation of the States is essential. And the attendance of a large number of delegates is expected.

Mr. Harold Pierce, Room 1112 Morris Building, Philadelphia, is the secretary of the Commission.

The nurserymen of California recently effected an organization for the purpose of "advancing the material and social sides of the nursery business." Among the promoters of the organization are F. H. Wilson, Leonard Coates, Fred H. Howard, Almon Wheeler, Thomas Chisholm, George C. Roeding, John S. Armstrong, and E. Gill, Mr. W. V. Eberly, of Niles, California, was elected president.

The Wisconsin forest reserves have increased in the last six years from 40,000 to 423,000 acres, but the State must have a reserve of at least 2,000,000 acres in order to protect the headwaters of the most important rivers, according to the statement made by State Forester E. M. Griffith in an address on "State Forestry," before the Department of Political Economy and Social Science at Lawrence College.

STATE NEWS

Massachusetts

Secretary Charles M. Bailey, of the State Forestry Division of Massachusetts, speaking on Forestry Development in New England at Boston recently, said: "No question is of greater economic importance in its relation to the future development of New England than forestry. There is no enterprise which offers greater possibilities of establishing permanent prosperity than the clothing of our non-agricultural lands with commercial trees, and the proper conservation of the forests now left to us.

"There are in Massachusetts today approximately one million acres of barren, desolate land now absolutely idle. These acres may again be made to produce timber to the value of millions of dollars. Not only is this true of Massachusetts, but similar conditions exist in the other New England states."

State Forester Rane, working under the provisions of the reforestation law, has now set out more than 40 separate plantations of white pine, covering several thousand acres, at an average cost of less than \$10 per acre. He has on hand now several hundred acres of land ready for planting next spring. The nurseries maintained by the Forestry Department at Amherst will supply the seedlings for this work.

Arkansas

In connection with the administration of the Ozark National Forest, the United States forest service has recently granted rewards amounting to \$250 for evidence furnished leading to convictions for setting fire to the woods. Payments of \$125 each have been made to Joseph A. Bost and John W. Bost, both of Rex, Van Buren County, Arkansas. These rewards are the result of Congressional action taken in the hope of encouraging the conviction of fire trespass cases on the National Forests.

In discussing the case Supervisor Kiefer, of the Ozark National Forest, said: "I am very much gratified with the outcome of this case since it stands as an excellent object lesson to those who are bent upon indiscriminate woods burning. The conviction shows that burning the National Forest is unlawful, and further that this law, which is state as well as federal, can be very rigidly enforced."

West Virginia

A dispatch from Wheeling, West Va., says: "Shortly after the reconvening of Congress, the National Forest Reservation Commission will receive estimates on those tracts of

land recommended by inspectors of the Bureau of Forestry as suitable tracts for the institution of forest preserves.

"West Virginia is vitally concerned in these hearings, as a half dozen inspectors spent a goodly portion of the past summer examining land in proximity to the watersheds of the State that appeared to be suitable sites for the establishment of forest preserves.

"Under the Weeks law, which provides for the Appalachian forest reserve, the government has the right to purchase several thousand acres of West Virginia land conducive to the establishment of reserves.

"Pendleton, Randolph, Pocahontas, Webster, Tucker, Preston, Greenbrier counties, are interested in the hearings; and, as the time for the consideration of opinion on tracts of land in these counties, whose purchase is contemplated by the government, draws near, an influx of lobbyists from the counties named is expected."

Connecticut

The General Assembly of Connecticut, in session in 1911, passed the following act: The state forester and the tax commissioner, with three other persons whom the governor shall appoint, shall constitute a commission, serving without compensation, to examine and consider the laws of this state and of other states and countries concerning the taxation of forest lands. Said commission shall report to the next general assembly the result of its investigations, with its recommendations thereon.

The members of the commission are as follows: State Forester S. N. Spring, New Haven, Conn.; State Tax Commissioner Wm. H. Corbin, Hartford, Conn.; Ex-Governor Rollin S. Woodruff, New Haven, Conn.; Mr. F. H. Stadtmueller, Secretary of the Connecticut Forestry Association, Elmwood, Conn.; Prof. Herman H. Chapman, Yale Forest School, New Haven Conn. The State Forester called the first meeting of the commission on December 29. Ex-Governor Woodruff was elected chairman and S. N. Spring, secretary of the commission. The first meeting included organizing, a discussion of the problems before the commission, and the preparing of preliminary plans for work.

Colorado

A meeting of forest supervisors of Colorado will be held in Denver early in February for the purpose of discussing some of the problems of active forestry work. It is expected that Forester Henry S. Graves will attend the meeting, but this has not

definitely been settled. The session is to be called by District Forester Smith Riley.

Among the problems to be discussed will be proposed methods of disposing temporarily of large tracts of land in the national forests which are not open to settlement, but which are suitable for use of stock during the grazing season. It is the policy of the department, Forester Riley said today, to give the utmost publicity to the existence of these tracts in order that the stock men may take advantage of them.

Indiana

The Indiana Forestry Association held a meeting in Indianapolis a few days ago and elected the following board of directors for the coming year: Governor Marshall, Charles W. Fairbanks, Addison C. Harris, President Bryan, of Indiana University; President Stone, of Purdue University; President McConnell, of DePauw University; Charles A. Greathouse, State Superintendent of Public Instruction; Professor M. B. Thomas of Wabash College; Dr. J. N. Hurty, W. A. Guthrie, John B. Conner, Edgar Perkins and George B. Lockwood.

Ohio

The Ohio State Forestry Society, at its annual session in Columbus on January 11, voted in favor of the state reforesting the lands that revert to it for unpaid taxes, and also of having the state buy cheap lands for reforestation. Addresses were made by Professor C. H. Goetz, of Columbus, Professor A. D. Selby, of Wooster, and others.

These officers were elected: Professor W. R. Lazenby, of O. S. U., president; W. J. Green, Wooster, vice-president; J. J. Crumley, Wooster, secretary; H. C. Rogers, Mechanicsburg, treasurer.

Minnesota

The gathering of pine cones to furnish seeds for the planting of forests in various states of the Union and in Europe is becoming quite an industry in Northern Minnesota, according to reports from Bemidji and other places. Fifty cents a bushel is offered for the cones in most cases, which furnishes a living wage to the boys and Indians who engage in the work and a good profit for those in charge.

Jack pine cones are the principal kind collected, although the cones of all varieties of pine are marketed. According to State Forester Cox, the jack pine seeds are used in Europe for crowding other trees in planting forests.

California

Contrary to the impression apparently becoming current, that prospecting on national forest lands is to be restricted by the forest service, District Forester Coert DuBois, at

San Francisco, has issued a statement, just received by Supervisor E. W. Kelley, of the El Dorado forest, that there is no intention of changing the existing policy of the forest service which encourages prospectors in every possible way. Permits for prospecting on national forest lands never have been and will not be required.

The Act of June 4, 1897, which makes provision for the administration of national forests, specifically says that prospectors shall not be prohibited from entering upon national forest lands for the purpose of prospecting, locating or developing the mineral resources therein.

In harmony with the plan of the Department of Agriculture, to increase the efficiency of the forest service in California, there will be a reorganization of that work beginning with the new year. The increase in the number of forest fires within the past few years and the fact that the forest rangers were compelled to cover such large areas that they could only have personal supervision of but a small part of their territory has made changes imperative.

Oklahoma

Oklahoma is getting into the procession as the following comment from the *Oklahoman*, of Oklahoma City, indicates:

"The larger part of Oklahoma is of prairie formation and, while in the eastern part splendid forests are to be found, Oklahoma has not enough trees.

"One citizen of this state who lives at Nowata has purchased 5,000 trees, which he will plant on his farm. The tree-planting habit has not become epidemic in Oklahoma, although in late years much progress has been made in forestry.

"Since the school children have been taught the value of trees, and have actually engaged in planting them on Arbor Day, there has been a general revival in the interest of forestry and the prairies of Oklahoma are beginning to be dotted with groves of trees that will be as artistic as they are valuable.

"But we will never get too many trees. Every citizen should arrange to plant something next spring, if it be only a single tree. A tree to each person would make nearly 2,000,000 additional trees. As many will plant hundreds and even thousands, only a few years will be required to make the state famous for its trees.

Vermont

The Vermont State Forestry Department knows of three industries that desire to locate in Vermont providing they are assured of sufficient hardwood supply with which to make their product. This information, given out by the Department, is probably an indication that the industries are desirable, and will not damage the state's progressive movement in the matter of forest preservation.

Pennsylvania

There are 15,000,000 acres in Pennsylvania better adapted for growing trees than for pasturage or raising crops. About half of this acreage is either barren and entirely unproductive or the products from it barely pay the expense of obtaining them. The State has bought 945,000 acres of this land, and the present desire of the Forestry Commission is to continue these purchases until not less than 6,000,000 acres have been obtained. It is now waste land and to grow trees on it calls for a long-time investment without any interest until the trees are mature, which does not appeal to private capital. The land is carefully investigated before it is bought by the state and none is acquired which does not have a clear title. The average price paid has been about \$2.25 an acre and much of it can now be sold for three or four times the purchase price, owing to the healthy growth of young timber on it. The public forestry work will be supplemented, as soon as legislative consent can be acquired, by assistance to private timber land owners. It is proposed that all private timber lands placed under the direction of the State Forestry Department shall be assessed at only \$1.00 an acre for a number of years, and in return for this low assessment the tracts must be cared for in accordance with the directions of the Department.

Kentucky

The Governor of Kentucky, in his annual message to the legislature on January 2, said in part: "I believe it is imperative that the General Assembly adopt a proper and adequate policy of forest protection, not only with the purpose of saving the timber now standing, but of reforesting the cut-over, the burnt-over and unforested districts of the state. A majority of the states are maintaining bureaus of forestry.

"I recommend:

"First—A State Forester, to be appointed by the Governor, who, by training and experience, is thoroughly qualified to handle technical forestry problems, as well as forestry educational work.

"Second—A campaign of education should be inaugurated and the State Forester should lecture at Farmers' Institutes and encourage elementary instruction in forestry in the public schools; also prepare and distribute appropriate bulletins."

New Jersey

The annual report of the New Jersey State Forestry Commission, sent to Governor Wilson January 8, shows that the condition of forests in New Jersey are improving; that forest fires have become less destructive than in former years; that many penalties have been imposed for violation of laws which have been enforced, and that much good has been accomplished.

The commissioners are unanimous in the belief that forestry has attained a permanent place in this state. Seven years ago, when

the commission was created, the report says that the woodlands of the state were so degraded that few persons believed it possible to save the remnant. Fires in South Jersey and reckless cutting in North Jersey were responsible chiefly for this condition. It is shown that today the situation is far more promising. Interested owners are in control of the woodlands in the north, and the security against fires in the south has demonstrated the forests there still may be saved.

Oregon

State Forester F. A. Elliott, of Oregon, in speaking of the necessity of the conservation of the forest wealth of the state, says: "Owing to lack of transportation facilities, our lumber business has grown very slowly, but last year we jumped from the eighth place among the states to third place; only Washington and Louisiana recording greater lumber production. In a very few years, at the most, we will be manufacturing more lumber than either of these states, and this must continue as long as our timber lasts. It is very important, then, that we use every means within our power for the protection of this, our greatest natural resource, and see to it that there is as little waste as possible in handling, manufacturing and marketing forest products."

Montana

Advises received at Butte, Mont., state that President Taft and Secretary of the Interior Fisher have approved of the plan submitted by Governor Edwin L. Norris and Attorney General Galen recently at Washington, for the creation in Montana of a state forest reserve, which will embrace from 400,000 to 500,000 acres of land.

New York

Bills providing for the reforestation of lands in New York State have been prepared for introduction in the legislature by Senator George F. Argetsinger. For some six months Senator Argetsinger has been devoting much of his time to the study of the question which he found to be complex and in which there were many problems which he found were not easy of solution.

The general plan of the bills is to create an incentive to land owners to plant trees on land which is not now cultivated. To provide this incentive the bills allow a reduction in the tax on land devoted to the growing of trees.

One bill provides for the taxation of auxiliary forest reserves and is a companion measure to one defining and establishing auxiliary forest reserves and providing a penalty for the violations of the provisions therefor.

In section one the bill establishing forest reserves, all land set apart for the growing of trees in accordance with the terms of the bill are made to constitute a separate and distinct class of lands to be known as auxiliary forest reserves.

Florida

Several thousand camphor trees have recently been planted by the officials in charge of the East Bay Florida ranger station at the forest nursery located there and, according to the statement of Forest Supervisor Eldridge, the indications are that this valuable tree will do well in this forest, which will prove much to this section of the state if this be true.

Last year a few hundred of these trees were planted in the nursery at East Bay and Mr. Eldridge says they have shown themselves well adapted to that section, and it was principally due to the apparent success of this first experiment that the government decided to try the experiment on a larger scale and had the planting done this year.

The government has maintained an experimental planting station for the camphor tree near Lake City for the past four or five years and the experiments conducted there have met with such success that efforts

are being made on the part of the government to induce private capital and individuals to undertake growing them on a commercial basis.

Indiana

In his annual report, C. C. Deam, Secretary of the Illinois State Board of Forestry, recommends that the state purchase such lands as will not permanently support agriculture and devote them to scientific forestry. This is the only solution of the problem the board of forestry has to suggest.

The principal argument for such a plan advanced in the report is that the state will never be reforested by any other means. There are thousands of acres of eroded hill-sides and worn-out fields in the state which should be planted to forest trees, it says. But investigation shows that in a majority of cases the owners of these lands are too poor to bear the expense of reforestation, so that the matter is neglected and conditions annually become worse.

NEWS AND NOTES

Mr. Graves' Report

Henry S. Graves, United States Forester, in his recently issued report, says of the co-operation with states and private timberland owners:

"The most important work of the year was in pursuance of Section 2 of the Weeks law, which appropriated \$2,000,000 for co-operation with the states in protecting the forested watersheds of navigable streams from fire. Such co-operation is extended only to states which have provided by law for forest-fire protection and have appropriated funds for that purpose. The amount expended by each state must at least equal that spent by the Federal Government. Prior to July 1 agreements were entered into by the Secretary of Agriculture, specifying as the maximum amounts to be spent by the Government during the remainder of the calendar year, if needed, the following: In New Hampshire, \$7,200; in Minnesota, \$10,000; in New Jersey, \$1,000; in Wisconsin, \$5,000; in Maine, \$10,000, and in Vermont, \$2,000. After the close of the fiscal year similar agreements were concluded providing for a maximum expenditure of \$1,000 in Connecticut, \$5,000 in Oregon, \$600 in Maryland, \$1,800 in Massachusetts, and \$2,000 in New York.

"The Federal funds were to be expended in each instance for the salaries of patrolmen exclusively. Coöperative agreements were entered into only after the State had submitted a fire plan and a map showing in detail the number and location of the protective force to be employed, the location of telephone lines, lookout towers and other structures forming a part of the protective system, the amount of State funds to be

expended for various features of the protective system, and how the Federal moneys allotted to the state would be used to supplement state expenditures. The agreements provide for inspection, by officers of the service, of the operation and efficiency of the coöperative protective system.

"Past experience in examining woodlots and privately owned timber tracts has shown that the methods of forestry recommended are actually put into effect in far too small a percentage of cases. While the educational value of the cases where forestry is practised is very great, it is important to increase their number. An attempt to do this is now made by giving greater attention, in the investigation made and reports submitted to owners, to the pecuniary advantages of good over poor methods of management, and by studies of market conditions in order to show owners how best to dispose of the products of their woodlands. Primary consideration is given to the applications and needs of small owners, since they are more disposed as a rule to put the methods recommended into operation.

"As the number of state and private foresters increases, coöperation with private owners is being gradually restricted. The needs of applicants from states in which it is still difficult to secure expert information and advice are, however, so far as possible, provided for. Examinations of a single woodlot in a locality are not ordinarily made. Instead the interest of several owners in a community is sought by informing applicants that a field examination will be made upon a joint application signed by a number of owners in the same locality. The cost of such examinations is shared by the owners, on an acreage basis. In connection

with such examinations studies are usually made of market or other conditions which apply to the community as a whole, and of the possibility of coöperative shipments of forest products. Public meetings with discussions of local forestry problems, the distribution of publications, the formation of local forestry clubs if advisable, and the collection of additional data needed for service publications are valuable features of this work."

The Government has vigorously undertaken the reforestation of Oregon and Washington and during December cones of the Douglas fir have been collected on an enormous scale. For the first time in the history of the Pacific Northwest steps have been taken to replace the forests now being cut away. According to the present plans of the National Forest Service this work will be continued year after year.

Gathering fir cones has become a new industry throughout this state. During September men, women and children picked the cones, being paid 50 cents per bushel for them. They were then taken to the government extracting plant at Wyeth, Ore., where the seeds were extracted, and large areas of the national forests will be reseeded during the coming winter.

A total of almost 10,000 bushels of the fir cones were secured by the forest service or about 7,000 sacks, which will be sufficient to plant about 7,000 acres. This is but the beginning of this work, and each succeeding season will see large additions to the replanted areas as the seed is available.

Homesteaders in western Oregon and Washington, where the fir trees are numerous, made money gathering the cones, receiving three to five dollars per day in many cases where the coniferous trees bore heavy crops.

Formerly the Government secured its fir seed from Germany for the comparatively small reforestation work that has been done in the West, but the foreign supply became inadequate to the demand and, in fact, Germany herself is now seeking to buy Douglas fir seed in America.

Official Recognition

Official recognition of the British Columbia Government has been extended to the Western Forestry and Conservation Association by William P. Ross, of Victoria, Minister of public lands.

In a letter received by Judge A. L. Flewelling, president of the Forestry Association, Minister Ross specifically indorses the work of the association and incloses a \$100 check as a government contribution to expenses.

In reply Judge Flewelling wrote Minister Ross as follows:

"Your letter is one of the most sincerely appreciated testimonials we have ever received. Our two-fold work of bringing about

better public sentiment toward protection of forest resources and of guiding and encouraging liberal expenditures and improved methods by forest owners is, we think, having excellent results, but it is especially gratifying to learn that you, on the other side of the line, have found it worth noticing and approving in such a substantial manner."

A County's Ambition

An effort to have 50,000 trees planted in Onondaga County, New York, during the coming year will be made by the Board of Supervisors. Untillable lands will be used for this purpose.

Not so very long ago the Board of Supervisors appointed a committee on reforestation and Charles S. Keller was placed at the head. He has made a thorough study of the lands of the county and reforestation, and has planned to make this one of the county features next year. He has been in communication with the Forest, Fish and Game Department of the State, and is now in a position to carry on the work of reforestation the county on an extensive scale.

Minnesota's Good Work

Note should be taken of the practical work being done for forest conservation in Minnesota, where 30,000 acres of bare prairie have been planted with trees under the State law which allows a maximum bounty of \$15 an acre for successful planting. The limit for which this bounty is paid to one person is \$150 for 10 acres in the course of six years, and it is estimated that only one acre in 20 now being grown to timber receives a bounty, but the law is said to give an effective stimulus to private enterprise.

A Government Timber Sale

The Government is advertising for bids on a large body of timber on the Tahoe National Forest, in California, with an offer of terms which inaugurates an important departure from the policy of the past.

About 73 million board feet of saw timber is offered for sale, with a 10-year period for the removal of the timber. The National Forests contain a vast supply of merchantable timber, estimated at the equivalent of over 500 billion feet board measure, a great part of which is ripe for the ax or already overmature. In many cases, however, the purchaser has to make a very heavy initial investment in transportation facilities. To have this pay, he must be able to figure on a large operation, requiring a number of years to carry through.

The Tahoe sale will call for the construction of 20 miles of railroad, which will be a common carrier and therefore decidedly beneficial to the community—another reason for making the sale which is taken into account. A minimum price of \$2.50 per thousand feet for yellow pine, the amount of which is estimated at 52 million feet, and

also for sugar pine, and of \$1 per thousand feet for all other species, is specified in the advertisement. The interest which has been shown by lumbermen in this sale leads the Forest officers to believe that one or more bids will undoubtedly be received. The usual conditions of cutting National Forest timber, to insure a renewal of the forest and close utilization of what is cut, will be incorporated in the contract of sale.

English Forestry Association

The English Forestry Association has re-

cently been formed, with the following officers: President, Lord Clinton; Honorary Secretary, Mr. Duchesne; Council, the Earl of Shaftesbury, the Earl of Chichester, Lord Hastings, Mr. G. L. Courthope, M. P., Mr. Chas. Bathurst, M.P., Colonel E. J. Mostyn, Mr. S. H. Cowper-Coles, Mr. F. G. Burroughes, Mr. Arthur Arnold, Mr. W. Anker Simmons, and Mr. Gerard H. Morgan. The objects of the association are to encourage the demand for English timber and generally to be of service to English producers of timber.

EDUCATIONAL

Better Forest Schools

Much progress has been made recently in the movement aiming to standardize forestry schools in this country. Chief Forester Graves says of this work: "At present there are some 20 institutions purporting to give high grade training in forestry, but considerable difference still exists in the amount of training and in methods of instruction. At the conference here several days ago reports from 16 of the most important schools in the United States on standardization were discussed at length and a report was presented from a special committee appointed to see what could be done along this line. The committee was retained to pursue its work.

"There is need also of properly-equipped ranger schools. While high grade training is being well taken care of, there is a lack of schools of the lower grade for the training of rangers for work in the public service and in private forests."

Site for Forestry School

Dr. C. A. Schenck, director of the Biltmore forestry school, which is in winter quarters in Germany, has requested the New York State conservation commission to aid him in procuring suitable quarters for the school in the Adirondacks. The Biltmore students will return to the United States early in April, and it is desired to obtain for them quarters near the large New York State nurseries in Lake Clear Junction, where they may have instruction and practical observations in tree nursery work.

Biltmore Students

The Bulletin of Biltmore students' work says: "The end of December finds us still in Darmstadt, deeply engrossed in the studies of the German Forests. Dr. Schenck has completed his course in silviculture, and has headed us into the lines, the angles, and the twists of surveying. Silviculture, as taught by Dr. Schenck, and in the surrounding conditions, has proven a most interesting and beneficial study. The practical experience in making seed-beds, in transplanting and out-planting, and the intimacy with German forestry which we are obtaining through our field work, have been most valuable auxiliaries to the course of lectures. Through

centuries of experiments with many failures and few successes, German silviculture has attained the highest degree of perfection. Here we should be able to obtain the very best training in the subject. And though the United States cannot successfully practise for financial reasons, the advanced German type of silvics for some time to come, we can profit by their experience. American conditions are continually contrasted and compared with those of Europe by the faculty, and methods and solutions are suggested; for we all appreciate the need of practical foresters with practical methods in America."

Gifts to Yale Forestry School

The *Springfield Republican* says: "It is announced that Andrew Carnegie some time ago promised a gift of \$100,000 to the endowment fund of the Yale forestry school as soon as its endowment funds reached \$500,000, and only \$40,000 is now needed to complete that sum. Another promise of \$100,000 to erect a memorial building for forestry purposes has been made by a person whose name is not made public, and it is expected that that fund soon will be paid in. The future plans of the school include the purchase, if the funds can be raised, of a school forest with an area of several thousand acres, to be used for practical forestry work and to be situated as near as possible to the school."

Forest Service to Aid

Another example of that educational cooperation between State and college that is already so common in the West and is rapidly becoming more common in the East, is furnished by the University of Washington which announces a short course in forestry started on January 2. The course is designed especially for forest rangers and guards, for timber owners and for all persons who want some knowledge of forestry and who have only a limited time to give to the subject. The National Government has set its seal of approval on the scheme by promising the lecture services of some of its experts. Instruction will be practical in every sense of the word and an abundance of field work will necessarily be one of the features.

CURRENT LITERATURE

MONTHLY LIST FOR JANUARY, 1912

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Encyclopedias, dictionaries and calendars

Forst—und jagd-kalender, 1912, v. 40, pt. 1. 237 p. Berlin, J. Springer, 1912.

Forest Education

Jackson, Edwin R. Forestry in nature study, with a key to common kinds of trees by Wm. H. Lamb. 43 p. il. Wash., D. C., 1911. (U. S. Dept. of agriculture. Farmers' bulletin 468.)

Forest Legislation

New Hampshire—Forestry commission. State of New Hampshire; forest laws and organization of the forestry department. 63 p. map. Concord, N. H., 1911.

Washington—Legislature. Forest protection law, to preserve forests and prevent and suppress forest fires, 1911. 25 p. Olympia, Wash., State board of forest commissioners, 1911.

Forest Botany

Trees, classification and description

Winkenwerder, Hugo. Short keys to the trees of Oregon and Washington. 16 p. Seattle, Wash., University of Washington, 1911.

Silviculture

Planting

Maldonado, Ernesto. Das dunas de Chanco i Tongoi. 17 p. pl. Santiago de Chile, Impr. Cervantes, 1908.

Pruning

Balfour, Isaac Bayley. Report on tree pruning. 6 p. pl. London, Published by His Majesty's stationery office, 1911.

Forest Protection

Insects

Hopkins, A. D. The dying of pine in the southern states; cause, extent, and remedy. 15 p. il. Wash., D. C., 1911. (U. S.—Dept. of agriculture. Farmers' bulletin 476.)

Swenk, Myron H. A new sawfly enemy of the bull pine in Nebraska. 33 p. il. Lincoln, Nebr., Agricultural experiment station, 1911.

Diseases

Kern, F. D. A biologic and taxonomic study of the genus *Gymnosporangium*. 104 p. N. Y., 1911. (N. Y.—Botanical garden. Bulletin, v. 7, no. 26.)

Selby, A. D. A brief handbook of the diseases of cultivated plants in Ohio. 456

p. il. Wooster, O. 1910. (Ohio—Agricultural experiment station. Bulletin 214.)

Fires

California—State board of forestry. A handbook of forest protection; forest laws, rules for the prevention of fires, list of firewardens, 1911; July issue. 63 p. Sacramento, Cal., 1911.

Washington—Forest fire association. Fourth annual report. 20 p. Seattle, Wash., 1911.

Western forestry and conservation association. Proceedings of forest fire conference of the forest protective organizations of the Pacific Coast, Portland, Ore., Dec. 4, 1911. 34 p. il. Portland, Ore., The Timberman, 1911.

Wyman, Thos. B. The relation of the mining industry to the prevention of forest fires. 7 p. Munising, Mich., 1911.

Forest Administration

Norway—Skogdirektøren. Indberetning om det Norske skogvaesen for 1910. 209 p. Kristiania, 1911.

Philippine Islands—Bureau of forestry. Annual report of the director of forestry for the fiscal year ended June 30, 1911. 42 p. pl., diagr., map. Manila, 1911.

United States—Dept. of agriculture—Forest service. The national forest manual; claims, settlement, administrative sites. 56 p. Wash., D. C., 1912.

United States—Dept. of agriculture—Forest service. Report of the forester for 1911. 78 p. Washington, D. C., 1912.

Vermont—State forester. Third annual report, 1911. 44 p. pl. Burlington, Vt., 1911.

Forest Utilization

Lumbering

Penny, John Compton, Comp. Tasmanian forestry; timber products and sawmilling industry. 2d ed. 98 p. il., map. Hobart, Tasmania, Dept. of lands and surveys, 1910.

Wood-using industries

Maxwell, Hu. The wood-using industries of Louisiana. 16 p. New Orleans, La., Lumber trade journal, 1912.

Forest by-products

Veitch, F. P. and Donk, M. G. Wood turpentine; its production, refining, properties and uses. 76 p. il. Wash., D. C., 1911. (U. S.—Dept. of agriculture—Bureau of chemistry. Bulletin 144.)

Wood technology

Warren, W. H. The strength, elasticity, and other properties of New South Wales hardwood timbers. 100 p. il., diagr. Sydney, 1911. (New South Wales—Dept. of forestry.)

Auxiliary Subjects

Statistics and commerce

- British Columbia—Bureau of provincial information. Yearbook of British Columbia and manual of provincial information. 358 p. pl. Victoria, B. C., 1911.
- Southern commercial congress. Proceedings, 3d annual convention, Atlanta, Ga., March, 1911. 1064 p. Wash., D. C., 1911.

Conservation of resources.

- Wisconsin—Conservation commission. Second report. 75 p. Madison, Wis., 1911.

Physiography

- Bowman, Isaiah. Forest physiography; Physiography of the United States and principles of soils in relation of forestry. 759 p. il., pl. N. Y., J. Wiley & Sons, 1911.

Nut culture

- Kyle, E. J. The pecan and hickory in Texas. 38 p. il. Austin, Tex., 1911. (Texas—Dept. of agriculture. Bulletin 19.)

Periodical Articles

Miscellaneous periodicals

- Agricultural gazette of Tasmania, Nov., 1911.—Forestry notes; eucalypts, by L. Rodway, p. 567-8.
- Botanical gazette, Dec., 1911.—Light intensity and transmission, by B. E. Livingston, p. 417-38.
- Breeder's gazette, Dec. 20, 1911.—Fenced pastures in range flock husbandry, by J. T. Jardine, p. 1292-3, 1346.
- Breeder's gazette, Jan. 10, 1912.—Growing Christmas trees, p. 107.
- Gardeners' chronicle, Dec. 9, 1911.—Ulmus plotii, by G. C. Druce, p. 408-9; The removal of tree stumps, by A. P. Long, p. 411.
- Journal of the Linnean society; Botany, Nov. 30, 1911.—Supplementary list of Chinese flowering plants, 1904-1910, by S. T. Dunn, p. 411-506.
- Philippine journal of science; C. Botany, Nov. 11.—Alabastra Philippinensis, 3, by C. B. Robinson, p. 319-58.
- Phytopathology, June, 1911.—The rusts of Tsuga canadensis, by P. Spaulding, p. 94-6.
- Phytopathology, August, 1911.—Notes on Peridermium cerebrum Peck and Peridermium harknessii Moore, by G. G. Hedgcock, p. 131-2.
- Phytopathology, Dec., 1911.—Injury to Pinus strobus caused by Cenangium abietis, by B. Fink, p. 180-3.
- Revue horticole, Dec. 16, 1911.—Populus lasiocarpa, by S. Mottet, p. 564-5.
- Science, Dec. 29, 1911.—A new record of a chestnut tree disease in Mississippi, by C. Rumbold, p. 917.
- Science, Jan. 5, 1912.—Devastation of forests in the White Mts., by F. W. Very, p. 31-5.
- Smithsonian institution, Annual report, 1910.

—Progress in reclamation of arid lands in the western United States, by F. H. Newell, p. 169-98; Transpiration and the ascent of sap, by H. H. Dixon, p. 407-25; Forest preservation by H. S. Graves, p. 433-45.

Trade Journals

- American lumberman, Dec. 16, 1911.—Development of natural resources considered a unit, by G. Pinchot, p. 42, R; Far west timber protection; conservation considered in convention of coast forest fire associations, p. 45-8.
- American lumberman, Dec. 23, 1911.—Winter operations in northern woods; work at camps in Michigan p. 40-1; Taxation of American timber holdings by C. W. Ward, p. 50-1.
- American lumberman, Jan. 13, 1912.—Present uses of wood waste, p. 46-7.
- Canada lumberman, Dec. 15, 1911.—Logging under government supervision; forestry principles applied to lumbering operations in western Canada, p. 32; Forest surveys; what they cost, by C. A. Lyford, p. 39; Lumber trade in United Kingdom, by J. H. Quail, p. 42.
- Carriage monthly, Dec., 1911.—Great oaks and their homes, by C. F. Shiels, p. 36-7.
- Lumber review, Dec. 15, 1911.—Wood blocks, the ideal movement by W. H. Dean, p. 11.
- Lumber trade journal, Jan. 1, 1912.—The wood-using industries of Louisiana, by H. Maxwell, p. 19-33.
- Municipal journal and engineer, Jan. 4, 1912.—Cresoting paving blocks p. 9-10.
- Paper trade journal, Dec. 21, 1911.—The future of our southern gums, by C. D. Mell, p. 48.
- Pioneer western lumberman, Dec. 15, 1911.—A log lowering device, by F. G. Frink, p. 29.
- Railway and engineering review, Dec. 16, 1911.—Douglas fir for structural purposes, by G. M. Duncan, p. 1074-5; Questions in tie treatment, by F. D. Beal, p. 1075-6; The wooden dower situation in Europe, by J. Thiollier, p. 1076-7; Fire proofing for timber trestles, American railway bridge and building association, p. 1077-81.
- Railway and engineering review, Jan. 13, 1912.—Improved method of treating ties and timbers, by W. F. Goltra, p. 29-35.
- St. Louis lumberman, Dec. 15, 1911.—The sugi process, p. 24, 80.
- St. Louis Lumberman, Jan. 1, 1912.—Preventing the sapstaining of lumber, p. 64; Lumber problems, by C. H. Shattuck, p. 67.
- Southern industrial and lumber review, Dec. 1911.—Tupelo, tupelo gum, or bay poplar, by H. von Schrenk, p. 46-7; Douglas fir; its present and future, by C. M. Duncan, p. 48-9.
- Southern lumber journal, Dec. 1, 1911.—Cutting logs in the woods as a basis of better grades of lumber at the mill, by A. J. Clark, p. 44-5.

Have you nominated any friends for membership in the Association?

If not—why?

The more members it has the greater will be the Association's influence in forest conservation.

Nominate at least one person for membership. It requires but a little thought, a little effort—and every little helps.



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THE NEW ITALIAN FOREST POLICY

By DR. GUIDO A. R. BORGHESANI

IN his recent treatise on public forest economy, Prof. Albert, of the Forest Academy of Eberswald, gives the following summary of the principles underlying the German forest policy: "to stimulate the consciousness, in every branch of the national economy, that the real interest of agriculture is synonymous with that of silviculture."

Now the state of affairs has been just the reverse of this up to the present in Italy, as in every country whose economic development is backward, such as Spain, Greece, etc. It is customary in the agricultural-pastoral class to consider the forest as antagonistic to pasturage and to farming; and when the Government intervened for the purpose of putting a stop to the deleterious effects of this ignorant attitude, it only aggravated this sterile antagonism by imposing purely negative restrictions.

And yet for silviculture also—as the present Minister of Agriculture in Italy, the Hon. Nitti, justly remarked for agriculture—the problem is a problem of production. Like all problems of production, however, it is resolved at bottom into a technical and organization problem. This, in fact, is the weak point of Italian silviculture, the main source of all the evils that afflict it and indirectly disturb the whole of the national economy: the real reason of its apparent sterility. We possess merely a modern forest technique which corresponds economically to our conditions and needs; we have not an active, sound and normal forest production, on the basis of a provident and sustained preservation.

It is natural, therefore, that in the face of a form of production which is inferior and disorganized, other productive forms which are better organized and, although less modern, are steadier and more consistent, should prevail, albeit in a somewhat parasitic manner. That is to say, it is natural that the Italian mountaineer (and two-thirds of Italy are mountains), who does not know how to estimate and utilize the intrinsic value of the forest,—the maximum volume growth—should prefer to break it up for the purpose of cultivating it, however badly, as long as the erosion of the soil allows him; or that he should send his sheep and goats to the forest to undermine its

existence, when he does not burn it in order to gain a poor and temporary pasture ground; because the only thing he knows is how to grow a little corn or obtain a small quantity of wool or of milk.

The problem, therefore, is not so much a matter of wasting time in the consideration of more or less useless juridical questions, as to whether or no it is the case to deal with the forest from the point of view of its secondary effects, but rather to study a way of placing forest production on a sure technical basis, because where a forest is naturally suitable, it will also be economically satisfactory.

ITALY'S ENORMOUS IMPORTATION

Economic bases are not lacking when there is the desire to utilize them. Timber is the product which has most increased in price on the international market, having increased by 300% from 1860 up to the present day. At the present time, Italy imports \$45,000,000 worth of forest products every year, that is to say, one-fourteenth of her total imports. Our most important importer, after Austria, is the United States, for a sum of about \$5,800,000. The excedent of the importation upon the exportation of forest products in Italy is \$17,000,000, about one-seventh of the total excedent of imports upon exports; and this difference is exceeded only by that of metals and mineral products, especially coal. But while the latter is a deficit with which Italy can do nothing directly, the former deficit is our own fault and we could repair it, instead of paying so many millions abroad, much more than we pay for wheat and flour and meat, the scarcity of which is so justly lamented.

A few figures will be sufficient index of the deficiency and inferiority of forest production in Italy, brought about by the negligent way in which it has been conducted. Whereas in countries which have a progressive sylviculture, like Germany and Austria-Hungary, the annual timber product of an acre of forest is a total of 45 cubic feet; in Italy this product is only 30 cubic feet.

A more serious side of the question, however, is that we produce only 3.75 cubic feet per acre per annum of the product which has really the greatest value—timber—while the other producing countries nearly quintuple this amount, having a timber product of 18 cubic feet. The consequence of this is that our timber consumption is also abnormally restricted, being 3.7 cubic feet per inhabitant per annum, instead of 15 cubic feet, as in the industrially progressive countries of Europe, like England, Germany and Switzerland. There is a vast difference between these figures and those of the United States, where the annual consumption per inhabitant is 160 cubic feet.

This enforced restriction in the consumption of wood, and especially of timber, is a serious impediment to many national industries. It was well, therefore, that the Second Italian Forest Congress, held at Turin on August 28-30, 1911, for the purpose of indicating the direction taken by the positive forest policy affirmed in the first Congress at Bologna, gave particular attention to the problem of forest production. This is the foundation of the Italian forest policy as of every other, because it alone puts this policy on a sure and



A TREE IN THE GREAT ITALIAN STATE FOREST, TUSCANY.



AFFORESTATION IN THE APENNINES, ITALY.

sound basis; otherwise,—it is useless to deceive ourselves—if the criteria of unsound forest administration followed in Italy up to the present be continued, any forest policy or action whatever is foredoomed to certain failure, being in antagonism with the very essence of national economy.

NEED OF NATIONAL POLICY

In fact, also for Italy, a policy which recognizes and promotes the economic importance of the forest is the only concrete, truly national policy.

This is the fruitful principle of every sound forest policy, in Germany, Austria, Switzerland, Russia, India, Japan, Australia, and let us hope also in America; and we must adopt it in Italy also, following the Scandinavian, English and Australian example and the strenuous defenders of the forests in America, if we wish to reconstitute a productive and permanent forest wealth. We must preserve and develop this wasted forest wealth of ours by means of rational utilization, if we do not wish to suffer one of these days from the threatened scarcity of wood which is already pressing upon us.

Dr. Fernow, in his suggestive and learned *History of Sylviculture*, thus briefly defined (1) the reasons of Italian forest impotence:

"The difficulty of determining what is and what is not necessary to reforest, what is and what is not absolute forest soil make ostensibly the greatest trouble and occasioned delay, but financial incapacity and political influences bidding for popularity are probably the main cause of the inefficiency."

But at the first Great Italian Forest Congress which brought together in June, 1909, at Bologna, under the patronage and with the strong interest of H. M. the King of Italy, all the highest personages of the political, agricultural and economic worlds of the Italian Nation, the principle of the positive intervention of the State was proclaimed for the first time in Italy, and crystallized in the following vote, proposed by the Minister of State, Hon. Luzzatti:

"The Congress decides that in conjunction with all the prohibitive and limitative bonds must be associated a positive policy of the State, which has up to the present been lacking."

A STATE FOREST LANDS ENTERPRISE

And it was as a matter of fact in actuation of the vote of the Bologna Congress, which found a wide echo in Parliament and in the country, that the law entitled "Provisions for the State Forest Lands and the Guarding and Encouragement of Sylviculture," was passed in June, 1910, by the Chamber and Senate. This law, which materialized the vote of the Forest Congress of Bologna, has as its main object the creation of a State Forest Lands Enterprise, instituted under the form of an autonomous undertaking, for the purpose of "providing, by means, of the amplification and inalienability of State forest property and by giving the example of a good industrial regimen, for the increment of sylviculture and the commerce in national forest products" (Art. 9).

As far as the safeguarding of silviculture is concerned, it is provided that the forest belonging to the communes, provinces, public institutions, corporations, associations and share companies must be utilized in accordance with the prescriptions of the forest authorities.

For the reconstitution of extremely deteriorated forests, the Ministry is authorized to grant the technical direction gratuitously and to give bonuses of from \$4 to \$8 per acre.

Barren lands, or those covered with grass or bushes, which are submitted to a rational reafforestation by their owners or by societies of owners are declared exempt from the land tax for 15 years if planned for coppice, and for 40 years if laid out for high forests.

The Forest, central and local authorities also should give gratuitous assistance to forest growers for the defense of small mountain properties and for the encouragement of the foundation of associations and societies of forest owners.

The sum of \$6,600,000 is ascribed on the budget for the first five years from the putting into force of the law; after which period the necessary increases will be settled fixed in the agricultural budget.

Now, as we have already stated, when once the principle of the positive intervention of the State was affirmed, it was necessary to establish in what way this intervention should be brought to bear on the lofty task of bringing about the resurrection of Italian forest culture, and of regulating the regimen of the waters compromised by the deforestation.

And it was thus, at the Second Italian Forest Congress, held at Turin last August, that among the other reports discussed and approved was that of Messrs. Maganzini and Valentini, civil state engineers, illustrating the plans for the application of the new law for mountain basins, approved in July of this year; which law was prepared by Mr. Maganzini himself, who is a member of the Superior Council of Public Works, and fixes a fund of \$13,000,000 for the regulation of the fluvial basins, most of which are torrential.

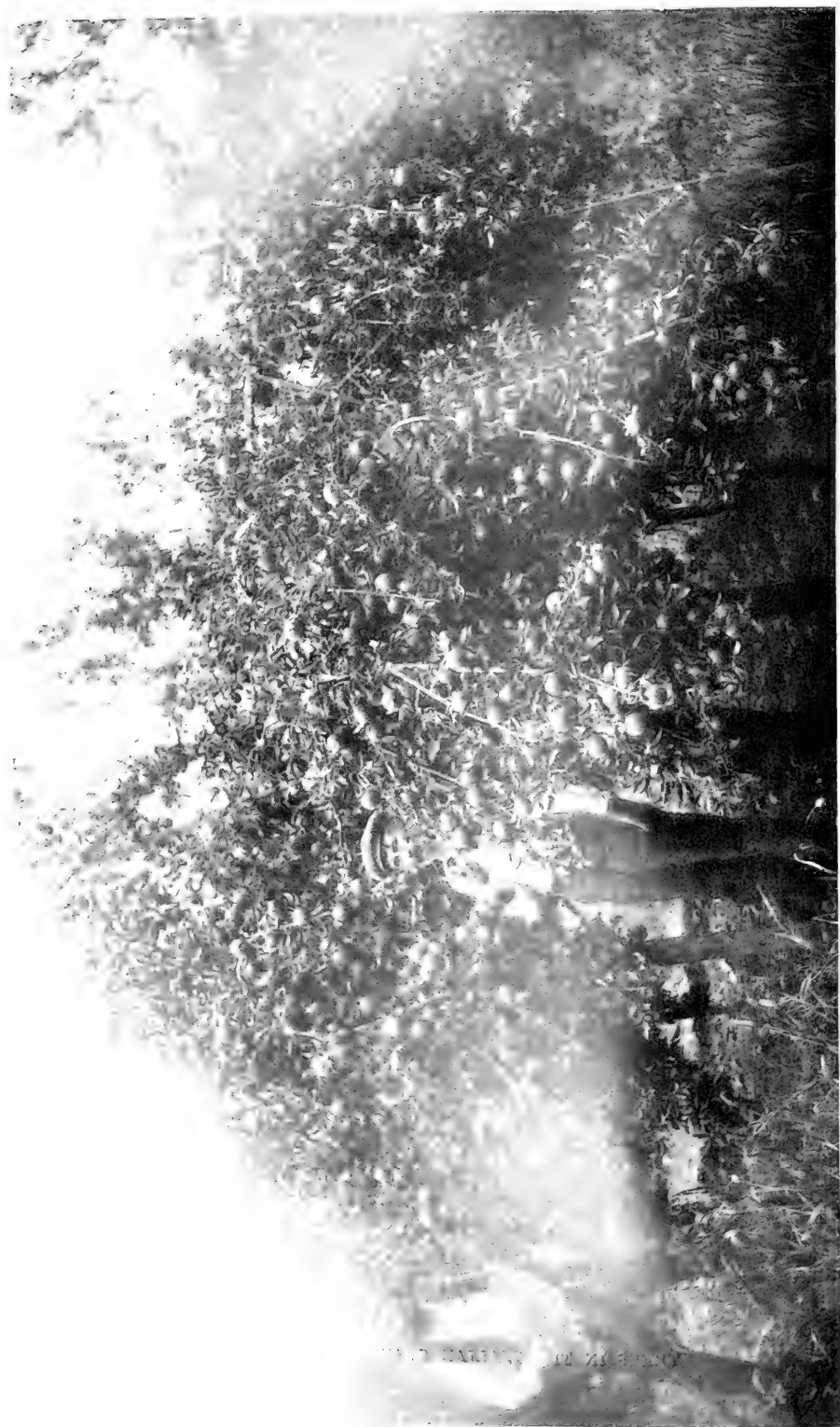
REPORTS ON THE SITUATION

A report of the Superior Forest Inspector, Manfren, and the Under Inspector, Di Tella, was then approved; this report established the necessity for a system of forest statistics. Another report that was approved was that by the writer of the present article, materializing the technical problems of Italian silviculture in the following manner, in order that sure and efficient working plans might be prepared:

1. To improve and render less costly the technics of afforestation;
2. To improve existing forests, and more particularly:
 - (a) to insure the most rapid regeneration of the forests, after the removal of the cutting products;
 - (b) to cultivate the most remunerative timber species;
 - (c) to bring to full density forests of low yield;
 - (d) to produce plants of good form and quality;
 - (e) to obtain the greatest volume increment possible contempo-



TREES IN THE ITALIAN STATE FOREST, TUSCANY.



YOUNG APPLE ORCHARD, YAKIMA VALLEY, WASHINGTON.

ranuously with the fuller density of the forest and the better quality of the wood.

As to this end affirmed as the principle of every positive forest policy that:

“A forest must be considered and guarded as a productive capital to be submitted to regular management, as a protection against the erosion of the soil and a regulator of the circulation of the waters.”

And expressed the desire that the institution of a Forest Experiment Station, with the following definitive aims and relative endowments, should be rendered compulsory in the bill presented to Parliament for the reform of forest instruction:

(a) to prepare the yield-tables of the principal tree species, native and acclimatized;

(b) to study the acclimatization of new remunerative forest species;

(c) to study and improve the methods of forest plantation;

(d) to study the technical properties of Italian timber products with the object of a better utilization; and finally, recommended that in order to get a preliminary knowledge of the elements of forest production in Italy, which is of such great economic importance and urgency, the inquiry into the private forest production started by the *Federazione Pro Montibus* be intensified and extended as much as possible.

In this way we shall have learnt the lesson taught by Dr. Fernow, and the seeds planted by the Congresses of Bologna and Turin will take root and develop to the benefit of the entire Italian nation, the forest economy of which, on account of its geographical formation, its climate, its commercial exchanges and industrial development, should form a third part of the entire economy of the nation.

The Italian Forest Congresses will be continued and organized every two years by the *Pro Montibus* Federation (Piazza Borghese 3, Rome, Italy), which was constituted precisely on the occasion of the Bologna Congress for the purpose of promoting more particularly the improvement of silviculture, reforestation, the systematization of the mountain forests and forest economy in general. Its President is Hon. G. B. Miliani, a strenuous and great paper-mills and lands owner.

The man who makes the greatest success of orcharding at the present time is the man who is giving the most attention to the control of insect pests in his orchard. While this may not be absolutely true in all cases it is true in the majority of them, at least.

Next summer the forests of Michigan will have the added protection of a big force of Michigan Forest Scouts, the boy organization now being perfected by Major W. R. Oates, State game, fish and forest warden, as a means of interesting the lads in the conservation of the woods as well as teaching them woodcraft in a practical way and then putting their knowledge to a practical use.

THE GREAT AMERICAN DESERT*

BY C. J. BLANCHARD

STATISTICIAN, U. S. RECLAMATION SERVICE

TO the bulk of our citizens the Great American Desert is still a region apart, and illusions concerning it which obtained in the days of Webster and Clay still persist. The average citizen of the East, whose vacation is usually spent abroad, and there are more than 200,000 unpatriotic Americans who annually seek their recreation in the Old World, regards our rainless country as the habitation only of hostile savages and deadly reptiles. Millions of our people, crowded in our great cities, have never felt the uplift of its unmeasured distances and its far-flung horizons. To those the desert means desolation, thirst and loneliness; a waste place, forbidding and terrible, wherein civilization has no place. Instead of a level plain of sun-baked, shifting sand, our desert is a region of varied and interesting topography, with every gradation of climate from semi-tropic to north temperate. It possesses all the climates of Europe, while its scenic wonders have no rivals in any country. In our desert proper are located all the important National parks, whose 5,000,000 acres of territory embrace more natural wonders than can be found in all other parts of the world.

To those of you who are accustomed to taking your vacations abroad, I wish it were possible to convince you that in our own country there are mountains which in sublimity and grandeur equal any in the Old World. The traveler may enjoy the wonders which a prodigal Nature has lavished upon us with a greater degree of ease than he finds in Europe tours.

Infinite variety characterizes the colors of the desert, for this is a land where the atmosphere itself has color. Strange and incomprehensible are the magical changes of tint in rock and bush and cloud at different hours of the day. These colors are often so transitory that the eye receives impressions which the mind refuses to accept as real.

The West needs more people and more money. If we could divert one-half of the present tourist travel from Europe toward the West we would hold in circulation in this country more than \$250,000,000; all of which is now annually expended abroad. The knowledge of the West and its resources gained by the tourist on his trip to view our scenery would increase his confidence in western securities and would encourage larger investment. The lure of this new country is so compelling that many who come would remain and take their part in its upbuilding. The returning tourist would direct others to seek the pleasures which have been enjoyed by him.

Two economic problems of obvious importance confront the people of the country today, viz: increasing the opportunities for our citizens to acquire



PEACH ORCHARD ONE YEAR OLD ON THE "SHIPLETON BENCH", WASATCH MOUNTAINS IN THE BACKGROUND.
STRAWBERRY VALLEY PROJECT, UTAH.



THE NARROW IN THE WORLD.
1902.

homes of their own, and a larger production per acre of staple crops. While we have not yet reached the acute stage in the struggle for existence which prevails in many parts of the old world and the Orient, we are not far removed from that critical period when over-population and under-production shall become vital questions with us. The enormous increase in the cost of the necessities of life during the past decade, and the consumption by our own people of nearly all of our cereals and meat products, furnish abundant evidence of the imperative need of better farming on the present cultivated acreage and the addition of new areas.

Notwithstanding the relatively large increase in our cultivated areas, and consequent augmentation of products, the growth of population has more than kept pace. There has been a continuous and rapid rise in farm land values, with a resulting decrease in the opportunities for men of moderate means to acquire homes. Naturally the centralization of a large percentage of our population in cities has continued. Unquestionably it is true that we are not short of land, but of what avail is it if this land is beyond the reach of the great masses of our people by reason of inflation in values, or because Nature has not made it ready for the plow.

The National Irrigation Congress has to its credit the initiation of one constructive legislative measure, the Reclamation Act, which in time will be regarded as the most valuable work of our national lawmakers since the passage of the Homestead Law, which opened to settlement the Mississippi Valley. It has under consideration now another measure of equally great importance, the drainage of the vast areas of swamps.

THE DESERT OF TODAY

The desert of our old geographies no longer has a place on the map. Its boundaries have shrunk until they are almost indeterminate, while its terrors are only traditions.

Today the homes of more than 300,000 happy families, surrounded by 13,500,000 acres of irrigated land, have been established, and the harvests contribute annually \$300,000,000 to the wealth of the farmers.

The magic of irrigation has transformed valleys long vacant and voiceless into prosperous and populous agricultural communities. It has created hundreds of cities, towns and villages, many of which have become financially and commercially great. It has brought to the remotest parts of the desert the benefits of transportation by steam and electricity.

National irrigation has already gone beyond the stage of prophecy. The material and substantial results flowing from the law places the work of the Government on a practical and solid foundation. Facts, not theories, furnish the arguments for continuing the work, and for increased appropriations to enlarge and extend its scope.

A brief summation of the activities of the bureau shows the magnitude of the work accomplished. These data are assembled to October 31, 1911. Construction is going on or has been completed on 29 projects, involving an expendi-

ture of \$65,470,000. In the eight years of actual work the Service has dug 7,000 miles of canals, many of which carry whole rivers. These canals placed end to end would reach from New York to San Francisco and back to New York. The tunnels excavated, mostly through mountains, have a length of more than 19 miles. The excavations of rock and earth amount to the enormous total of 77,-200,000 cubic yards. As much of its work is located in regions heretofore almost inaccessible, it has been necessary to build and maintain 570 miles of wagon roads and 1,700 miles of telephones. The Service has in operation 275 miles of transmission lines, and is furnishing its surplus power and light to several cities and towns.

It has completed three of the greatest irrigation dams in the world, and the storage capacity of its reservoirs, several of which are now full, is 10,000,-000 acre-feet, or enough water to cover that many acres a foot deep.

In its construction work the bureau has purchased 905,827 barrels of cement, and its own mill manufactured 340,000 barrels, effecting a net saving of \$600,000 by so doing.

VAST INCREASE IN LAND VALUES

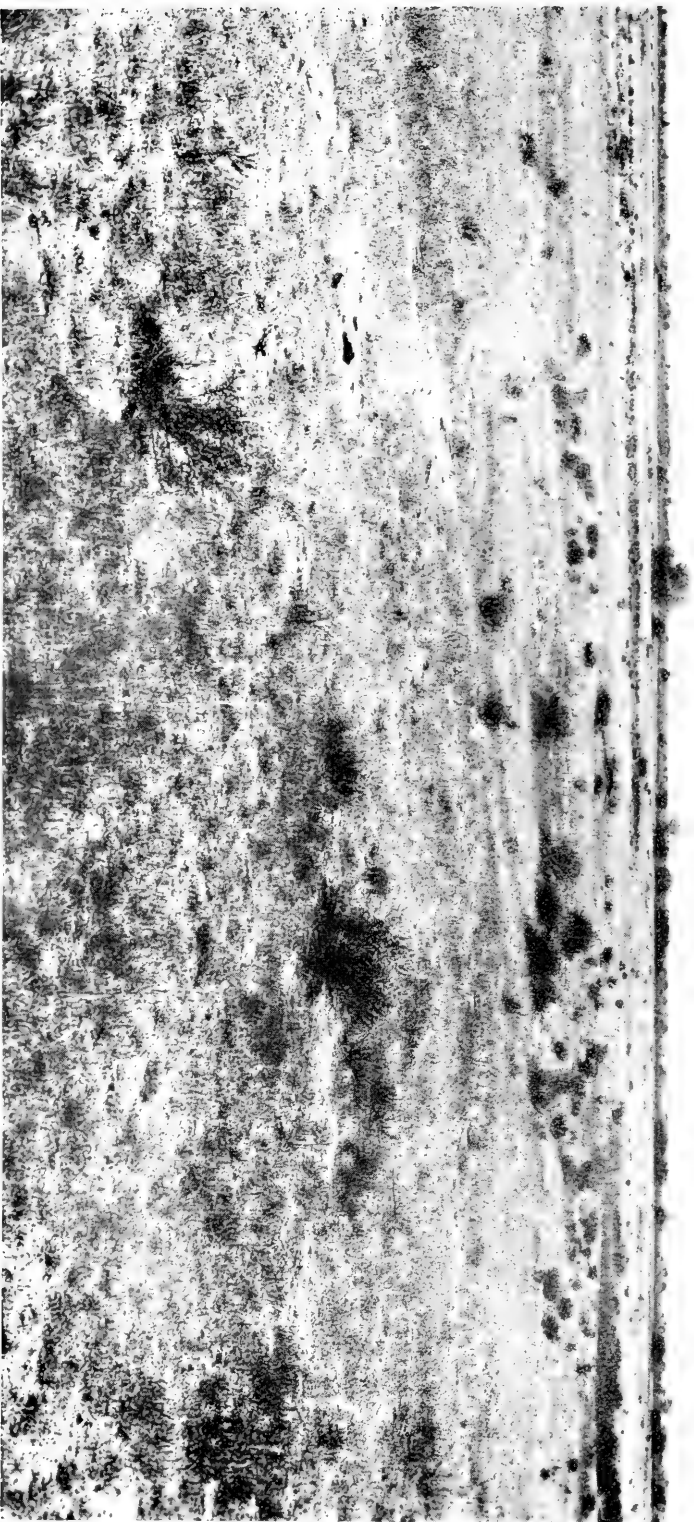
Water is now available for 1,086,000 acres of land, upon which approximately 14,000 families are residing in their own homes. As a result of the investment already made by the Government, land values have increased more than \$105,800,000. The astonishing increase in land values resulting from the reclamation of desert land is shown in a recent sale of a forty-acre farm adjoining the Government townsite of Rupert on the Minidoka project in Idaho. This tract of land in 1904 was sage brush desert and valueless. This spring it sold for \$11,000. It was filed upon as a homestead, and the original entryman had paid back to the Government not more than three annual instalments of his water right, or less than \$8.00 an acre. On several projects a single crop has enabled the settler to repay all his obligations to the Government.

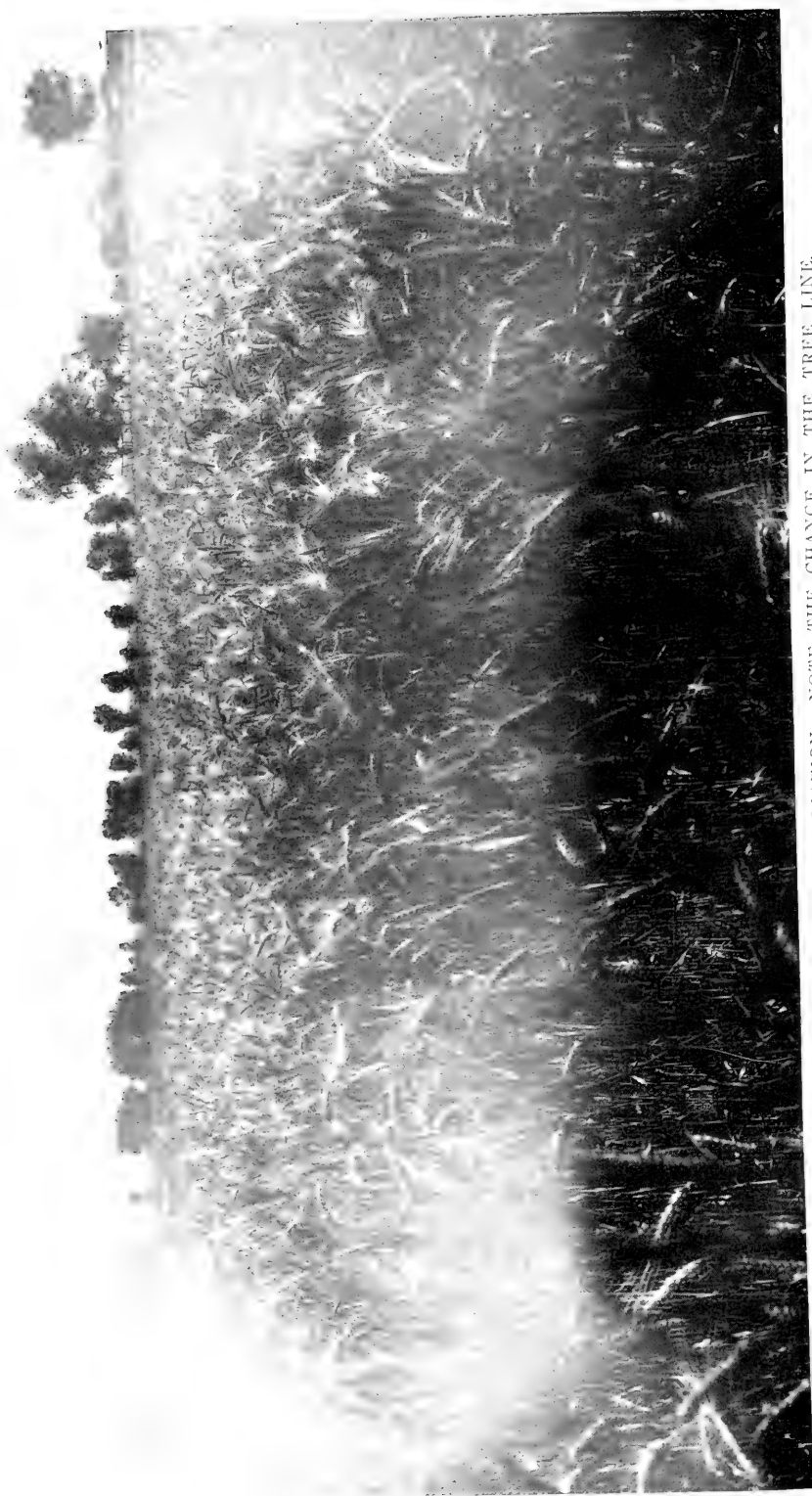
The gross value of crops grown on the projects in 1911 is estimated at \$24,000,000.

The growth and development of the towns on the reclamation projects are proceeding along lines which have promoted numerous communities in southern California now recognized as nearly ideal centers of population. In substantial business blocks, in commodious schoolhouses, numerous churches and in artistic and beautiful homes, these new communities are far in advance of those of many older sections of the country.

The small farms intensively cultivated and grouped about these villages and towns give the effect of suburban rather than rural conditions. Cheap power developed from the great dams or from numerous drops in the main canals is now utilized in the operation of trolley lines which reach out into the rural districts and bring the farmer in close touch with the city. It turns the wheels of numerous industrial plants, and various enterprises, in which the farmers are part owners, for storing, handling, and manufacturing the raw products of the farms. The same power is used in the lighting

SALT RIVER PROJECT, ARIZONA. BEFORE IRRIGATION. DESERT WITH CAMEL BACK
MOUNTAINS IN THE DISTANCE. (See next page.)





THE SAME CACTUS DESERT AFTER IRRIGATION. NOTE THE CHANGE IN THE TREE LINE.

and heating of the towns, and for cooking in the homes. On several of the projects the farmers are applying for electric power, and on many farms the housewife has made it a useful servant in her domestic duties. This important and very valuable asset will in time become the property of the land owners, and will return considerable revenue to them.

The compact settlement which is the inevitable result of irrigation, brings to the farmer conveniences and luxuries which heretofore were unknown to the country. The daily delivery of mail, circulating library, centralized graded schools, frequent association with neighbors in the management of their various organizations for marketing products, and in the operation of the irrigation system, have made farm life varied and interesting. In no small degree these same factors have been responsible for a noteworthy increase in the number of city dwellers who are turning to the soil for a living. The question "Can a business man without previous experience in agriculture succeed on an irrigated farm?" finds an answer today on a thousand Government farms where former city dwellers are making good. They demonstrate that a good business training is a very important adjunct to successful farming in the irrigated country.

On a number of the projects every acre of land is occupied. So great has been the hunger for farms in some sections that the work could not be pushed fast enough to supply the demand for homes. Those projects possessing the most favorable climate naturally attract the most people. Idaho, California, Oregon, Washington and Colorado, for this reason and also on account of generous exploitation on the part of State and other organizations have received the largest influx of settlers. Every acre of land on these projects for which water is available has been filed upon.

On the Minidoka project in Idaho there were 1,014 farms, and practically every one was taken up before water was ready. On the Yuma project in Arizona the first unit opened had ten applicants for each farm.

Today the 354 Government farms awaiting settlers are in the Northwest in the states of South Dakota, Montana and Wyoming.

WORK FOR THE FUTURE

For the next few years the activities of the bureau will be directed to rounding out the plans for completing the projects already taken up.

Among the spectacular works which will engage the attention of the engineers are the construction of two enormous dams, each of which is comparable with the great Roosevelt dam, and each of which in certain features exceeds the latter.

In New Mexico the work of erecting a huge masonry dam across the Rio Grande will require at least five years of active labor and a large force of men. This structure in some respects is one of the remarkable storage works of the century. It will cost more than \$6,000,000, but it will insure the future development of 100 miles of valley, comprising 180,000 acres of extremely fertile and productive country.

The Arrowrock dam in Idaho, upon which construction has begun, stands in a class by itself among the engineering works of the world. In its greatest height, 351 feet, it ranks all others. Its cubical contents will be 500,000 cubic yards.

Appreciating the difficulties which all settlers encounter during the first few years on the desert land, and the outlay of money required to establish a home and prepare the land for crops, the Secretary of the Interior in several instances has formulated a plan for graduating the payments, making the early payments small until the crop returns suffice to meet the charges for building and operation.

There is little or no disposition on the part of the farmers to break faith with the Government. The delinquents are remarkably few and our eastern brothers have no reason to fear that the West will not meet its full obligation in returning the loan which the Federal Government is making. The percentage of actual failures is surprisingly small and the causes therefor are inherent in the individual rather than in any fault in the works or in the country. Given a little capital and an abundance of grit and industry, and there is little cause for failure on the part of any individual.

In the great construction work in which the Reclamation Bureau has been engaged, it has had its troubles and has made its mistakes. It entered upon a field new and untried, and covering a vast area. A fair judgment upon the work as a whole I believe will be favorable, and will furnish arguments for its continuance.

*From address before the National Irrigation Congress.

During January 214,749 acres of land in the State of Idaho believed to be underlain by phosphate rock were withdrawn on recommendation of the United States Geological Survey. This makes a total outstanding withdrawal in Idaho of 1,167,137 acres of phosphate land. In Wyoming 1,266,688 acres are now withdrawn as phosphate land, in Utah 107,745 acres, in Montana 33,950 acres, and in Florida 35,640 acres, a total of 2,611,140 acres.

The American Historic and Scenic Preservation Society is preparing to carry out the wishes of the late W. P. Letchworth by turning the meadows and agricultural lands of Letchworth Park, at Portage, into forests for the purpose of demonstrating just how timber can be produced and the depleted wood lands restored.

Prussia has a forest of 7,000,000 acres. It is very similar to what our Appalachian region would be if we added to it some of the pine lands farther south. In 1865 these forests yielded a net profit of 72 cents an acre. In 1900 the profit was \$1.58. In 1904 it was \$2.50, and this year it is expected to be around \$5.

There is a prevailing tendency among orchardists to underestimate the danger from hold-over blight in the pear and apple, and with this mistaken idea has crept in a certain amount of carelessness in the attention which is given to diseased trees.

INVESTIGATING FOREST INSECTS*

BY DR. L. O. HOWARD
CHIEF OF THE BUREAU OF ENTOMOLOGY

THE news about forest insect investigation is, on the whole, very good, but there is one bad piece of news, and that is that the Southern pine people are going to suffer a lot of damage during the summer in the South. We have been trying to stir the people up, and we have told them what to do this winter. Many of them are going to do it, but not all of them. That is the only bad piece of news. The rest of the news is very good.

The timber owners of the Northwest, with the co-operation of the Forest Service and our own Bureau are doing a lot of administratively experimental work in the way of destroying threatened invasions of the bark beetles in that region, as well as in other parts of the country. The forest insect service of the Bureau of Entomology has studied the question for years, and has elaborate plans which it hopes to put into effect if we can only get the co-operation of all parties interested.

I should say that another very good item of news is that a new Governor has been elected in the State of New Hampshire. One of his predecessors,— I will not mention his name; in fact, I have forgotten it—was hardly as enlightened a man on the subject of forestry and other questions as the present incumbent of the office, and when the gypsy moth got across the State border into New York, I called on the new Governor and found him in his store. I told him who I was and told him of the harmful effects of this gypsy moth. I said I would like to talk with him a little, and perhaps he would like to talk with me and get my views as to how to spend the State appropriation. He said, "Sure, Doctor, you may, but before you begin I want to tell you about myself. When I was a boy, I was living with an old aunt on a farm. Boylike, I thought I knew the whole thing, and so I thought I would give my aunt advice as to how to run her farm. The old lady listened to me with perfect courtesy, and then went and done just as she darned pleased." I took it in proper spirit, but I do not think I would be greeted that way by the present Governor.

By the way, that former Governor appointed a man in charge of the work who had crude ideas. It was stated in the newspapers that this man had a queer idea in regard to the brown tail moth, which was that if all the cities and towns in the State of New Hampshire should shut off their lights about the time the brown tail moth started to fly about, the light of the moon would attract them and they would fly so high that they would die from exhaustion. The present Governor has discharged that man and has appointed a sound man.

There has been some good news about the southern gypsy moth situation during the last year. Of course, you are all familiar with our attempts to import the European and Asiatic parasites of this creature, and then depend

upon their spreading quickly over the country; but the important thing is that even if the parasites do not get control in a number of years, it will still be possible to get a very good situation in regard to forests in New England, because of recent facts discovered about the life and character of the Asiatic moths. There are large owners of pine trees who are particularly apprehensive of the loss of their trees; in fact, the gipsy moth, once on their pine tree, in a pine grove not particularly well cared for, would increase to such an extent that in two years they would kill the tree.

We have found by careful study that the young caterpillars hatched from the egg-mass high up on the trunk of the trees try to eat the leaves and they find they cannot. Then they fall to the ground and eat the oak scrub, until they get full grown, and then they climb up and eat the leaves, thereby killing the trees in two years. Therefore, we put a tanglefoot band around the tree, and we found there was no despoliation, even though the tree above was plastered with egg-mass. In investigating the matter further, we found that there were other varieties of trees which the caterpillars acted on in the same way, such as maples and chestnuts. Where those trees were growing in a mixed grove of trees, the oak scrub and brush were all eaten from the start, but with the eggs laid upon the other trees, the same procedure was followed. They had to find subsistence for the early part of their lives upon the oak scrub, and then they climbed the trees. Therefore, it becomes a system of forest management. An oak forest alone cannot stand the loss; but where you have a mixed forest, and you eliminate the oaks and birches to a considerable extent, you are going to be able to have a forest that will not be harmed by the gipsy moth.

The insect situation on the whole is very good at the present time, and we are elaborating methods of control, which, by the co-operation all over the country of the different States, will enable us to handle this serious matter.

*Address at the annual meeting of the American Forestry Association.

Bids have just been opened at the Forestry Bureau for the cutting of stumpage timber under Government supervision on the Sitgreaves and Apache National Forests and the Fort Apache Indian Reservation. The cutting comprises 600,000,000 feet, 300,000,000 feet on the Indian reservation and 300,000,000 feet on the two national forests.

The largest tract of timber that the Government has ever offered will be advertised by the Forest Service shortly on the drainage of the north fork of the Joaquin River in the Sierra National Forest. Eight hundred million feet are in the tract, consisting for the most part of sugar and yellow pine, white fir and cedar. Its development will probably mean the construction of about 70 miles of railroad. A line can be built in on the Southern Pacific at Friant.

A rich citizen of San Antonio, who owns extensive gardens, has announced his intention of giving away thousands of trees and shrubs. Not all of his neighbors are on the receiving list, however, for this man will not give a tree or shrub to other rich people. He will present such things to the owner of a home that is worth less than \$2,500. Persons who own costly residences

TIMBER SALES ON THE PLUMAS NATIONAL FOREST, CALIFORNIA

BY RUFUS S. MADDOX

TIMBER sales on National Forests are of so recent origin that their real meaning is known only where they are being made. When the forests were first set apart lumber companies were dubious about attempting purchases, the cutting of which must be conducted by Forest Service methods; but today many companies are operating who are supplied by timber bought from the Government. Timber, when made accessible by a railroad, has a greatly improved market. The Western Pacific Railway through California opened up a large area of forest land—both private and public—the timber from which lumbermen are buying, not only because of its accessibility, but because they have learned, and are still learning, that they can make profits by operating under Government regulations.

Government sales are managed on one general plan and with one object in view, viz., to provide for and maintain a future stand through measures adopted in logging the present crop. This plan of management eliminates at once the old time method of slashing down a portion of the forest, removing such as is wanted and leaving the area demolished. It is recognized that the market conditions help determine to what extent inferior grades can be handled; in other words, how close the utilization can be made. Formerly, where timber has been abundant and no restrictions put upon the operator, the largest and quickest profits were often aimed at regardless of the conditions after logging. In conservative lumbering or logging by Forest Service methods, therefore, it is necessary that in contracts made with lumber companies certain provisions be made as to what must and what must not be done. For example: none except marked trees shall be cut, brush must be piled, stumps must be cut not over a certain height, care must be had in felling and removing the timber so as to damage the reproduction and remaining stand as little as possible, and the timber used as far as practical.

Of the timber sales now under operation on the Plumas National Forest the two largest are to the Feather River and Marsh Lumber Companies, having headquarters at Portola and Loyalton, California, respectively, and their plants are perhaps fairly typical of the medium size mills in the Sierra Nevada Mountains. They each have five-year contracts (contracts allowing them five years to remove the timber) with the Government totalling 105,000,000 feet board measure, consisting of western yellow pine (*Pinus ponderosa* and *Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), Douglas fir (*Pseudotsuga Taxifolia*), while fir (*Abies concolor*) and incense cedar (*Libocedrus decurrens*), the former sale being for 30,000,000 feet and the latter for 75,000,000 feet.

On these sale areas (as well as on all Government sales) all the timber that is to be removed must be marked by a forest officer. He is responsible for the work whether done by himself or by some one assisting him. Upon his judgment depend the amount and kind of trees that are to be left to form the remaining stand and to restock the open areas. He must know the silvical characteristics of the different species and their relative values. His work does not consist simply of putting the Government stamp on the trees that he wishes removed—that is by far the smallest part of his work. The various conditions of the stand, slope, maturity of timber, soil, etc., present the problems that are difficult, and he must solve them according to his judgment, and treat that portion of the forest in accordance with his decision. Because of the fact that all the marked trees must be felled, he is directly and entirely responsible for the stand remaining, except the damage that may occur during the progress of logging.

After the timber has been marked the Government field supervision of the operations devolves upon the expert lumberman assigned to this forest (Mr. P. A. Kennedy), who sees that the specifications of the contract are abided by, some of the main features of which are that the brush is piled, care taken of reproduction, and stumps cut low. His time is taken up in keeping an oversight on the operations. He inspects the work of the fallers, sees that care is had to prevent breaking from falling; that stumps are cut to service requirements; that the trees are used well up into the tops; in other words, that the utilization from the stump is as close as possible. Under his direction the brush is piled. The crews of brush pilers are shown by him just how the work is to be done and they follow his instructions. His duties do not necessitate his being constantly at the heels of the lumber jacks. They understand that his instructions are to be obeyed, not that he is a "boss," but because it is the policy of the companies to live up to their contracts, and their employees know that his instructions have reference only to the fulfillment of the contract.

THE SCALING OF THE LOGS

The expert lumberman is also responsible for the scaling of the logs. Since his duties require him to be in the woods so much of the time, it is necessary that he have a scaler for each of these sales. They are Forest Service men assigned to that duty under the supervision of the lumberman, who assumes the responsibility. This does not mean that the scalers are irresponsible. It means that the lumberman is responsible for the work done by them, just as the supervisor is responsible for the work done by the expert lumberman or any other man on the forest force. The scaling is done where it is most convenient to the companies. They also have scalers of their own, and it is very good evidence that the Government scale is satisfactory to them, since no complaints have been made by them.

Each company has a camp of about one hundred men, who get out from 40,000 to 50,000 feet per day (per camp). The work is done quite systematically on the plan of "division of labor." The felling, trimming, bucking (sawing



LUMBERMAN P. A. KENNEDY AND HIS HORSE ON YELLOW PINE STUMP CUT ON FOREST SERVICE METHODS ON THE PEATHER RIVER LUMBER CO'S SALE AREA ON THE PLUMAS NATIONAL FOREST.



SIX-HORSE TRUCK HAULING LOGS ON PEATHER RIVER LUMBER CO'S SALE AREA, PLUMAS NATIONAL FOREST, GIVES AN IDEA OF DUSTY LOGGING ROAD.



STEAM LOADER ON MARCH LUMBER COMPANY'S LOGGING RAILROAD,
PLUMAS NATIONAL FOREST.



PLUMAS

SKIDDING ON GOVERNMENT TIMBER ON
CUT 40,000 PER DAY.

the trees into logs), snaking, and brush piling are each done by a crew of men who do that and that alone. One feature of the logging, common throughout the Pacific Coast, is the one-man bucking. Two men sawing with the same saw is, so far as I know, never seen except in the case of the fallers. Each buckner has his own saw, furnished by the company, and he uses it alone. The timber is soft and not difficult to saw. Pitch is the worst hindrance and that is readily overcome by kerosene, a bottle of which is carried by each man with a saw.

The milling season for the two companies begins in May and lasts until about the middle or last of November, but logging in the woods may continue longer, depending upon the rain and snow. Up to the present the winter logging has been limited entirely to decking the logs in the woods until the milling season opens in the spring.

THE WORK OF THE COMPANIES

The Feather River Lumber Company to date has been logging altogether with horses, the number required being about fifty or sixty. Their timber is located chiefly on mountain sides sloping into canyons up which logging truck roads are built. A skidder with his team of two or four horses and an assistant is provided for each six-horse team truck. They skid the logs from the mountain sides to landings on the logging roads and help the truck driver load each trip. During the past season the length of the average haul was about two and one-half miles. Six 6-horse trucks making three trips per day supplied the mill cutting an average of 40,000 feet per day, thus making the loads average about 2,200 feet each.

Because of the long, dry summer the logging roads become very dusty and for this reason the 3-trip instead of 4-trip haul was established. Not only is the dust very severe on the horses, but it also necessitates a smaller load than would be hauled on a firmer road.

The logging done by the Marsh Lumber Company is on a different plan, being that of donkey engines and high wheels. The high wheels are a sort of cart made up of a tongue, two high wheels varying in height from 8 to 12 feet, and a large axle to which the logs are swung. They are used on the most level ground, on short hauls not exceeding one-quarter of a mile from the logging railroad. The donkey engines are used to snake the logs from the rough and steep places into chutes that extend from the logging railroad up the ravines and canyons. Horses snake the logs in the chutes to the logging railroad where they are loaded on to the cars by a steam loader.

The Feather River Lumber Company is now making an addition to its method of logging. A standard gauge railroad is being constructed to their main body of timber and a pond dug for the logs at the mill. In connection with their planing mill they have recently installed an apartment for getting out sash and door stock, a product that must be free from knots. By filling mills for sash and door stock they are now able to get out a large per cent of clear lumber which was formerly shipped directly from the stack and sold

common stock. The common lumber is now sawed into short pieces of specified dimensions, thus enabling the knots to be gotten rid of. From two carloads of common one car of clear can thus be obtained. The former, I am informed by one of their officials, sells for about \$160 per car, the latter for about \$1,000 per car; also some of the knotty lumber from which the clear is cut can be used in the box factory, which they are now building in connection with their planing mill.

DISPOSAL OF THE BRUSH

The long, dry summer and the well exposed situation of their lumber yard make it unnecessary to have drying kilns. The lumber dries evenly and rapidly in the stack, whence it goes directly to the planer. The Western Pacific and the Nevada, California and Oregon Railroads have each a spur into the lumber yard, making transportation easy to local and distant markets.

Perhaps, to the nonconservative lumberman and to people unacquainted with the danger from fire in slash, it may seem not only unnecessary, but even an imposition upon a company to have to pile the brush so that it may be burned; but for safety to the forest and for the promotion of rapid restocking after logging, the disposal of the brush by piling and burning is both an economic, and in fact, the only business-like way to handle it, since there is not yet any way to utilize it. The cost of the brush piling devolves, of course, upon the operator, but at a small amount per thousand feet, amounting on these two sales to between 15 and 20 cents. The cost of this brush piling, however, is taken into account when reckonings by the forest officer are made for the cost of logging upon which the stumpage prices are recommended before the sale is made; it, therefore, can not be called an extra expense put upon the operator, not an expense which has had no consideration.


The burning of the brush has thus far been done by forest officers, although the companies agreed in their contracts to furnish help when called for. The brush burning does not consist merely of burning brush. If so, it would be most quickly and most readily done in dry weather, but with every chance for a forest fire, and also the actual destruction of a great deal of the reproduction as well as a great many trees.

The fall of the year is the time aimed at in which to dispose of all the brush from the sales. Speed is not an essential factor in this kind of work. The fall rains or snows must have set in in order for the least damage to result. Usually by that time (the middle or last of November), the forest officers can be shifted so as to take charge of the work instead of depending upon outside help. Ordinarily, when a light snow one and one-half to two inches deep has fallen, the time is ideal for burning. Naturally, the air is cold and no fire can spread; no great amount of heat is conducted to the seedlings, large reproduction and trees. The snow on the piles melts, runs through the dry brush, and prevents the blaze from becoming so intense. The brush from these two sales for the past season's cutting has already been disposed of. The light snow that remained through the ten days of this work

(November 11 to 22), afforded almost ideal conditions and the amount of damage done to the reproduction caused from the disposal of the brush from about 10,000,000 feet was almost negligible.

As a protective measure against fire, about four miles of fire lines on the Marsh Company's sale area was constructed during the fall by men not in the service, but employed by the service for this work, under the supervision of a forest officer. The construction of the line consisted of clearing a trail eight feet wide of all debris and piling it so as to be burned. The line was made between the sale area and private land, a good deal of which was slash from the Marsh Lumber Company's own private cutting. This system of protection will be conducted on all the sale areas of the forest. The fire lines not only afford ready help in case of forest fire, but also make up a fine network of useful trails on many portions of the forest as the timber is removed.

A VIGOROUS PROTEST

 R. GIFFORD PINCHOT, one of the vice-presidents of the American Forestry Association, has issued an appeal to Congress in which he makes a vigorous protest against the proposed reduction of the annual appropriation for fighting forest fires, from \$1,000,000 to \$200,000. He points out that the value of the forests of this country is estimated at fifty million dollars with a potential value of a billion dollars, not considering the protective value of the forests on the stream flow.

Mr. Pinchot says that the emergency forest fire fund of the Forest Service should be at least \$500,000. He says:

"The protection of public property and of the lives of settlers, their wives and children, as well as of public servants in the National forests, lies close to the public welfare. It is easy to malign the Forest Service as certain members of Congress are accustomed to do. But it is much easier to malign the Forest Rangers than it is to do their brave and efficient work on the fire line. We must not let false economy further imperil the safety of the public resources and the protection of human lives."

During the month of January more than 30,000 acres of land in Montana and Oregon were recommended by the United States Geological Survey for designation as enterable under the Enlarged (320-acre) Homestead Act, and 23,097 acres previously designated under this act were reported to the Secretary of the Interior as not enterable and canceled as such, detailed examination having shown the lands to be susceptible of irrigation.

PROGRESS IN FORESTRY PLANTING IN THE NEBRASKA SAND HILLS

ONE of the largest tree nurseries maintained by the Federal Government is located at Halsey, Nebraska, (and is maintained) in connection with extensive planting experiments to determine the possibility of producing a forest growth within the sand hill region of western Nebraska. But a very small per cent of the sand hill land is fit for agriculture, the greater portion being a rolling hill country covered for the most part with coarse grass that is but indifferently suited to grazing. When the sod is broken up the fine sandy soil drifts badly—so badly, in fact, that hundreds of “nesters” who have tried to make a start in this region have moved out only when their fields have blown into the next section or county. This may seem to those unfamiliar with this region an extraordinary statement. However, when one understands that the soil has the appearance of fine sea-sand; also that the wind blows fiercely throughout this entire country, the statement does not appear so overdrawn. On a bright day in spring in the sand hill section of Kansas, with what is known in that country as only a brisk wind, it is possible to locate all of the ploughed land for from 15 to 20 miles around by the dense clouds of sand that stand out against the blue heavens like pillars of gray smoke.

Experiments carried on at Halsey for the past seven years have proven pretty conclusively that success can be secured in plantings, provided only good sturdy stock is used and the plants are put in with care.

THE ANNUAL PRODUCTION

The capacity of the nursery has been raised to an annual production of 2,000,000 plants, and as transplanted 1—2 and 2—1 stock is used, some time will be required to get the nursery up to this output. The sandy soil which is readily worked, make excellent seed and transplant beds, provided it is heavily fertilized with well-rotted manure and an abundance of water is used. It is next to impossible to use water to excess, as the soil is so light that within one hour after completely flooding the soil can be worked to advantage. An abundance of water is secured from the Loupe River by pumping, and irrigation is used throughout the nursery except on the seed-beds, for the period of two or three months after sowing. The beds are made on a level with the paths. If irrigation is started and it is found that the paths are lower than the beds, they are filled in so the water will run directly over the bed and not in the paths.

The beds are sown during the month of April, so the plants which are produced at a density of from 6,000 to 8,000 to the bed, 12 ft. by 4 ft., will get the full benefit of the entire growing season.

The beds are sown and covered with burlap, which is placed directly upon



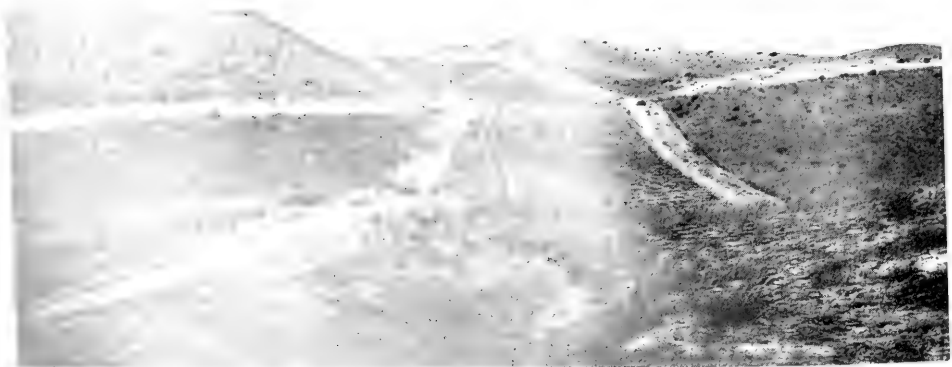
FROM SIDE HILL ABOVE NURSERY HOUSE, SHOWING JACK AND SCOTCH PINE,
1904-05-06-07 PLANTING. HALSEY NURSERY, NEBRASKA NATIONAL FOREST.



SEVEN-YEAR-OLD JACK PINE. NOTE THE LOOSE SAND IN THE
FOREGROUND. NEBRASKA NATIONAL FOREST.



NOTICE THE FURROWS IN THE PLANTATION TO THE LEFT. THE SOIL HAS ENTIRELY DISAPPEARED IN THAT PORTION OF THE GUARD EARLIER PLOWED. DISMAL RIVER DIVISION, NEBRASKA NATIONAL FOREST.



THE WIND DIRECTION IS FROM NORTH TO EAST, AND THE MAIN FIRE GUARDS ARE FROM NORTH TO SOUTH AND FROM WEST TO THESE ARE CROSS GUARDS FROM EAST TO WEST. NEBRASKA NATIONAL FOREST.

the ground. The beds are then covered with a slat shade frame about 12 to 14 inches above the surface of the bed and the sides are protected with boards. As soon as germination starts the burlap is removed and the ground kept moist. The boards protecting the sides of the beds are also removed soon after germination is complete.

Where the plants can be developed to sufficient size, say six to seven inches in height the first year, good results can be secured by transplanting to the transplant beds the following spring. Where the plants are left two years in the seed beds a greater loss is experienced in transplanting, to say nothing of the cost of keeping them the extra year in the seed beds. Where the ground has been put in good shape, five men and four boys, using the "trencher" spade and the transplanting boards, can put in from 20 to 24 thousand per day, and do it well.

IMPROVED METHOD OF PLANTING

As soon as the ground is free from frost in the spring, the field stock is taken up, heeled in, and covered with a layer of coarse hay. The field planting is started just as soon as a gang of men can be secured, and when a sufficient amount of field stock is ready to keep the field gang going. Eight men with six horses, and using the trencher plough, can field plant from 11 to 14 thousand trees per day. This method gives a figure per man far in excess of that where the spade or dibble is used and a correspondingly low figure of cost. The results in living trees from the two methods of planting are about equal.

The question of the protection of these plantations from fire is of first importance. In locating the plantation, the first step has been to develop a complete system of fire guards that will protect the young pines from the fires in the tall coarse grass. These may be started by lightning, through the carelessness of a "nester," or by railroad engine sparks. As the prevailing winds are from west to east, the main guards are from north to south and protect the plantation on the west. On the south and east reasonable protection is assured by the Loupe and Dismal rivers. The main guards are 175 feet wide with a ploughed strip one rod wide on the outer edges.

During the early winter, a time when the winds are not bad, particularly at night, the grass between the ploughed strips is burned off. It takes two years after such a burning for the grass to become sufficiently thick to burn again. In addition to four main guards, which are about one mile apart, there are cross guards running east and west that divide the plantation into comparatively small blocks and thereby give ample means of checking or confining a fire that may start within the plantation proper. These cross guards are single ploughed areas one rod in width. Owing to the fineness of the sandy soil the guards can practically be made permanent by disking the first and second years after ploughing, to destroy the sod and weed growth. After this sod is destroyed the soil drifts and the guards become "blowouts" that require very little cultivation.

As the plantation becomes larger the guard system will be extended ac-

cordingly. This can be done at no great cost, since the original ploughing can be contracted for \$6.00 per acre and the disking can be done for far less.

It is not surprising that the settlers of this region take a keen interest in this work, as practically every land locator in this vast, treeless, wind-swept region feels the necessity of a shelter wood that will protect his buildings, garden and small fruits. A picnic is held at the Halsey Nursery each year and the settlers come many miles to observe the progress of the work.

The Kinkaid Act that was passed by the last Congress, provides that the Government shall distribute trees from the Halsey Nursery to settlers who have taken lands in that region. To provide for this distribution, the output of the nursery will be greatly enlarged, and it is hoped that by another year or two, 25,000 pine trees of different species will be ready for distribution under this Act. Some time will elapse before the nursery can fully meet the demands for this distribution, since from two to three years are required to produce a hardy transplant fit to survive under the rigorous conditions of the region

THE CHESTNUT BLIGHT CAMPAIGN

By PERCIVAL S. RIDSDALE

FOLLOWING heated discussions as to the value of fighting the destructive chestnut blight, for which scientific men have been unable to discover a remedy, the Chestnut Blight Conference, held at Harrisburg, Pa., on February 20 and 21, decided to endorse the work of the Pennsylvania Commission which has directed the cutting down of affected trees, urged the national government, the State governments, and Canada to follow the example set by the Keystone State, and called upon Congress to pass the bill providing an appropriation of \$80,000 for the use of the Department of Agriculture in investigating the disease and endeavoring to find some method of eradicating it.

It was also decided, in order to overcome the financial loss caused by the cutting down of affected trees and to stimulate trade in chestnut timber, to ask the Interstate Commerce Commission to permit railroads and other transportation companies to lower freight rates for the distribution of the unaffected timber and as much cutting as the market will permit was urged.

It was deemed wise to also arrange for more systematic publicity and educational work so that small wood lot and other private owners may be instructed how to detect the disease and what to do when they discover its presence.

There is no doubt but that great good will result from the meeting. Twenty-one States were represented, some of them by a number of delegates, and Canada also sent one expert to learn what he could of the disease. Several papers were read and addresses made on various phases of the blight, its introduction into this country and the methods employed by various

persons and organizations in fighting it, and these were followed by most interesting discussions.

Several able men expressed the opinion that it is merely wasting the people's money to fight the blight when there is no certainty that the methods employed would prove effective. On this point there were some heated discussions, the men opposing it contending that no progress would have ever been made in anything had it not been that optimistic men had tried various plans for accomplishing the results desired. "Had we waited," declared I. S. Williams, deputy commissioner of the State Forestry Department of Pennsylvania, "until it was possible to build a perfect engine, we would not have locomotive engines, trains and steamboats today." His views were generally shared by a majority of the other delegates and it was decided that any methods tried in an effort to eradicate the disease were of benefit. Many, it was said, might prove failures, but they would show how not to fight the blight, while there is always the possibility that the right method would be discovered during the experiments.

THE METHOD OF FIGHTING

What has been most effective so far in the effort to check the disease has been the cutting down of diseased trees as soon as they are discovered, and the establishing of dead lines on the borders of land to which the disease has spread. This has resulted in greater good than any other method and is now being generally adopted.

There were a number of advocates of cutting down, at once, every stand of valuable chestnut timber in affected territory and marketing it, in order to prevent the blight extending further, but it was pointed out that this would be no assurance of the blight not appearing in other localities.

As to the means by which the blight spreads opinions differed. Some believe that woodpeckers, other birds and squirrels are the chief mediums for distributing the parasite while the majority held that the spores are so very light that particles of them can be carried long distances on a light wind. The concensus of opinion was that the wind is a far greater aid in the distribution of a blight than is any other medium. It was also admitted that the holes which the woodpeckers bore in the trunks of trees in search of grub worms permit easy ingress of the chestnut blight parasite, with the result that it soon penetrates beneath the bark.

Members of the Pennsylvania Commission urged the adoption of their plan of preventing the spread of the disease. This is to at once cut down and destroy any affected trees, and to as far as possible establish a dead line and confine the affected area within it. This appears to be the only plan at all effective so far in checking the blight.

Members of the Commission also wanted the convention to know that out of the State appropriation of \$275,000 for investigating the disease only a little over \$20,000 has so far been spent.

As to the value of the trees and the cost of the destruction already caused by the blight there was not much dispute. It was reported that the loss in Pennsylvania so far is about \$10,000,000. The annual cut of chestnut in the United States is valued at about \$20,000,000, and the total loss so far is estimated at \$25,000,000.

Dr. Hugh P. Baker, of the Pennsylvania State College, estimated the value of the chestnut timber of the country at \$300,000,000 and said that the loss so far is two thousand times what has been spent for protection. He said that each State needs an annual appropriation of from \$20,000 to \$50,000 to fight the disease and conduct its investigations.

It was also reported that affected timber cut down and marketed is of far poorer quality than healthy trees and that the railroads have reported that diseased chestnut timber made into railroad ties does not hold the spikes tightly.

Governor Tener, of Pennsylvania, opened the convention with an address in which he dwelt upon the necessity of vigorous efforts being taken to prevent the entire destruction of our chestnut trees by the blight. Dr. R. A. Pearson, of New York, was elected chairman of the convention, and F. W. Beasley, of Maryland, and S. D. Detwiler, of Pennsylvania, the secretaries. Addresses were made by Dr. J. K. Collins, of the United States Department of Agriculture; Prof. F. C. Stewart, of the New York Agricultural Experiment Station; Prof. W. Howard Rankin, of Cornell University; Prof. H. R. Fulton, of Pennsylvania State College; Dr. Caroline Rumbold, of Pennsylvania; Prof. Nelson F. Davis, of Bucknell College; Samuel B. Detwiler, of the Pennsylvania Chestnut Tree Blight Commission; Dr. Hugh P. Baker, of Pennsylvania State College; Dr. J. Russell Smith, of the University of Pennsylvania. In addition, many of the State foresters and experts reported conditions in their own States, took part in the numerous discussions or participated in asking questions regarding specific conditions.

Altogether the convention was a most enthusiastic gathering and one which it is certain will result in great progress being made in the fight against the destructive blight.

W. B. Greely, silviculture branch of the Forest Service, in speaking of the killed timber which had been sold recently, gave the following figures: In the last 18 months the Government has sold 365,000,000 feet in western Montana and northern Idaho. The most recent sale, two weeks ago, was a tract of 25,000,000 feet on the Two Medicine River, on the Lewis and Clarke National Forest. This consisted mostly of logpole pine, Douglas fir and Engelmann spruce. Fifty-five million feet was recently sold on the St. Joe River in Idaho. This was mostly white pine.

FOREST SCHOOL OF THE UNIVERSITY OF IDAHO

THE School of Forestry of the University of Idaho was organized in September 1909. Idaho has approximately 150,000,000,000 feet of excellent timber practically untouched by the ax and saw. The State also has vast areas of absolute forest land, now treeless, which should be placed under forest management and made to produce to its utmost that for which it is best adapted, namely, forest products.

Because of these enormous forest interests it was realized at the outset that forestry would soon occupy a prominent place among the courses offered at the University.

In addition to the extensive timber holdings of private owners, and of the State, large corporations control over 2,000,000 acres, and the National Forests include over 20,000,000 acres. The administration of these vast forest regions calls for the services of many men trained in forestry subjects. In the northern part of the State, covered as it is with heavy forests now ready to be utilized, the present demands are along the lines of protection, development and utilization. In the southern part of the State, which is practically treeless, farm forestry, grazing and reforestation problems are most urgent. In fact, Idaho demands two classes of foresters trained for very different lines of work.

In view of the varied demands of the State it seemed wise to organize two four-year courses in forestry, one in the College of Letters and Sciences and one in the College of Agriculture.

This has been done and the plan is working in a very satisfactory manner. The two courses contain exactly the same forestry subjects but the first named aims to prepare technical foresters, having as collateral courses a liberal training in mathematics, languages, physics and chemistry. The students completing this course have an excellent foundation for research work should they desire to specialize in any of the utilization branches. They are also valuable as forest assistants and are sought by the lumber companies.

The course in the College of Agriculture is somewhat lighter in the number of credits required and aims to develop the student more fully along biological and agricultural lines. These students are well prepared to fill field positions, dealing with grazing, farm forestry, protection and reforestation. The demand for men of this class to fill positions as rangers and deputy supervisors will be large in Idaho for years to come.

Very little if any additional expense has been incurred by offering the two courses instead of one as we meet the demands of the northern half of the State by co-operating with the faculty of the College of Letters and Sciences while those of the southern half are met by co-operation with the College of Agriculture.

A short course of ten weeks is offered for rangers, a course in general forestry for the students of the various departments of the University, and a short course in farm forestry for students in the College of Agriculture.

Dr. C. H. Shattuck, head of the department, has been a student of forestry since the movement first began to attract attention in this country. To a thorough scientific training at the University of Chicago, where he took his doctorate in botany, and special courses in forestry at the Biltmore Forest School, he has added years of practical experience in field work in the main forest regions of the United States. He is devoting his attention to lumbering, utilization, and management.

Prof. H. A. Wadsworth is a graduate of the Idaho Forest School, 1911. He is devoting special attention to forest engineering, protection and mensuration. He has been in the employ of the Forest Service during the past four summers and has had an excellent opportunity to study the practical problems in his lines as they occur in the field.

The entire time of both instructors is occupied in teaching forestry subjects only. All mathematics, language, biological and argicultural subjects, etc., are taught by the specialists in charge of those departments. Special lectures and courses are given on various forest subjects by Forest Service officials and other specialists. Throughout all the work of the forestry courses emphasis is placed on laboratory exercises and work in the field. As far as it is possible the student is made to learn by doing.

NATURAL ADVANTAGES

The finest forest of white and yellow pine, larch, and cedar to be found in the world are easily accessible to Moscow, while heavy forests of spruce, white and red fir, and other species can be reached in a few hours.

Some of the largest sawmills ever built, with all that is latest and best in equipment and methods of operation, are close at hand, while pulp and paper mills and other secondary wood-using establishments are within easy reach. Moscow is in the heart of what will soon be one of the greatest wood-using centers in the country.

EQUIPMENT

The forest laboratories are equipped with ample apparatus for thorough work in such courses as require indoor study. A very full line of microscopes and microscopic and lantern slides is available for use in the study of plant tissues—mechanical and other structures peculiar to different woods, as well as for the study of the pathology of woody stems and leaves and the life histories of insects and fungi injurious to trees. The department has also a full line of forest insects and fungi known to be injurious to the forests of the State, an herbarium of trees and shrubs of the Northwest and a complete collection of the tree seeds of American trees. A collection of several hundred species of the most valuable woods, both native and foreign, is also available. A great variety of logging, lumbering and foresters' tools and instruments is at the disposal of the students. The department is also equipped with



LARGEST KNOWN WHITE PINE TREE. PROPERTY OF
POTLATCH LUMBER CO., 20 MILES FROM MOSCOW,
IDAHO. 207 FEET HIGH. 425 YEARS OLD.



UNIVERSITY OF IDAHO STUDENTS IN FOREST ENGINEERING ABOUT TO REMOVE A
TREE IN THE WAY OF A TRAIL.



THE SAME

ING BY UNIVERSITY OF IDAHO STUDENTS.

a Gurley mountain transit, compasses, levels, plain tables, traverse boards, etc., for use in forest engineering. Ovens, baths, retorts, scales and chemicals are at hand for use of the students in timber physics and by-products work.

Students in timber testing have access to a 200,000-pound capacity Olsen universal testing machine in the department of civil engineering. This machine is completely equipped for tension and compression tests with beam extensions for transverse tests of full sized beams up to sixteen feet in length.

An arboretum and demonstration plot of about five acres has been set apart for work in silviculture, where about one hundred and forty species of forest and park trees are being grown. A nursery and greenhouses are also available for use of the students in silviculture. The University has secured six hundred and forty acres of excellent timber land near Moscow, and the students spend part of each school year at practical work in this forest. The library is supplied with the best works on forestry and related subjects, and the reading tables contain the leading periodicals and trade journals on lumbering and other phases of forestry. These are carefully reviewed each week when the entire department assembles for work in the forestry seminar.

FOREST CRAFT

Throughout the entire course the students are taught the ways of woodsmen, such as taking natural trail observations, observing game signs, orientation at night or on cloudy or smoky days, cooking, making and breaking camp, care of horses, and camp equipment, care of health, and means of protection against wild animals, insects, and fire; also methods of camping and sleeping in deep snow, first aid to injured, and simple remedies for colds and other ailments.

N. B.—Since the above was written the timber owners and lumbermen of northern Idaho have agreed to a plan to pro-rate their timber holdings in the State to the extent of \$58,000.00 for the purpose of erecting a forestry building at the University of Idaho. It is the plan of the University authorities that the building and equipment will cost \$100,000.00 and will be as complete as possible in every detail.

Mr. Emil P. Secker has been appointed commercial agent of the Department of Commerce and Labor to make investigations with respect to trade conditions in the lumber industry in foreign countries. Mr. Secker will make certain preliminary investigations in the United States, covering a period of about six weeks, with a view to securing information which will aid in his investigations abroad.

MEETING OF THE CANADIAN FORESTRY ASSOCIATION

By E. A. STERLING

THE Canadian Forestry Association held its thirteenth annual meeting in the Parliament Building, Ottawa, on Feb. 7 and 8. In point of attendance and enthusiasm, it was one of the most successful meetings ever held, and our Canadian friends have reason to be proud of the growth of the Association and of the interest which is being manifested in forestry matters throughout the Dominion.

The two days' meeting was characterized by the large number in attendance and by the comparatively small number of papers read, which, however, resulted in very interesting discussions from a large number of those present. The following papers were read: "A Progressive Forest Policy Requires an Investment of Capital," H. R. McMillan, M. F.; "The Attitude of Railroads Towards Forest Fires," by E. A. Sterling, F. E.; "The Aims and Objects of the Canadian Forestry Association," by E. Stewart, F. E.

Dr. B. E. Fernow's paper in regard to forest fires, and the report of his committee appointed by the Association to consider this question, were of particular interest. Lack of organization as regards forest fire protection pertains in the forests of Canada as it does in the United States, but all seemed agreed that with proper organization and co-operation between the various interests, the fire damage could be very materially reduced, if not entirely controlled. The lumbermen and forest officials of various provinces pointed out the difficulty of procuring good men in remote districts who could be depended upon for proper patrol and other precautions for the prevention of fires. Unfortunately, some of the appointments have been more or less political, and the result is that men entirely unfamiliar with the woods have attempted to serve as guardians of the forests.

The address given by Mr. Pinchot on the second day's meeting struck to the very heart of the question of Forest Service organization. Mr. Pinchot spoke frankly and clearly in regard to the difficulties which had been encountered in developing the Forest Service in the United States, and on the basis of his broad experience in building up such an organization, he was able to point out the essential factors on which an efficient service must depend. He emphasized the necessity of keeping free from all political entanglements, and favored the placing of heavy responsibility on comparatively young men. Another fundamental point which he made was the necessity of giving the field men a square deal, because under ordinary conditions, when they are given no opportunities to get in personal touch with the office, their recommendations are liable to be turned down without sufficient consideration. Trying to get the field men's point of view, and

the transfer of office men to the field and field men to the office, was recommended.

On the evening of February 7 the joint banquet of the Canadian Forestry Association and the Canadian Lumbermen's Association was held in the Parliamentary Restaurant, attended by about 200 members and friends of the two organizations. Among the prominent men in attendance were Premier Borden, Sir Wilfred Laurier, Hon. Sidney Fisher, Mr. H. M. Price, Mr. Gifford Pinchot, Hon. Geo. E. Foster, Mr. Alexander McLauren, President Lumbermen's Association; Mr. Wm. McNeil, a prominent lumberman of Vancouver; Dr. B. E. Fernow, Dean of the Forestry Department of the University of Toronto; Mr. R. H. Campbell, Superintendent of Forestry for the Dominion of Canada; Mr. Aubrey White, Deputy Minister of Lands and Forests, and Sir Frederick Borden. Mr. Geo. Y. Chown, President of the Forestry Association, acted as Chairman, and toasts were proposed to the King, to Parliament, to the Lumbermen, "Our Guests," the Forest Services, and the allied interests.

Among the Canadian members present there was a friendly exchange of persiflage on the recent political changes, but good fellowship and enthusiasm were the keynote of the convention. The earlier speakers, among whom were Hon. Mr. Fisher, Right Hon. Borden, and Sir Wilfred Laurier, paid high tribute to Mr. Pinchot as representing the highest conservation and forestry interests in the States. Mr. Pinchot, in replying to the toasts, "Our Guests," made a most excellent address on general conservation questions.

The officers elected by the Forestry Association for the ensuing year were: Honorary past president, Sir Wilfred Laurier; honorary president, Rt. Hon. R. L. Borden; patron, His Royal Highness the Governor-General; president, John Hendry, Vancouver; vice-president, Hon. W. A. Charlton, M. P., Toronto; territorial vice-presidents—Ontario, Hon. Mr. Hearst; Quebec, Hon. Jules Allard; New Brunswick, Hon. J. K. Fleming; Nova Scotia, Hon. George H. Murray; Prince Edward Island, Hon. J. A. Mathieson; Manitoba, Hon. R. P. Roblin; Saskatchewan, Hon. A. E. Brown; British Columbia, Hon. W. R. Ross; Yukon, Commissioner Black, McKenzie, F. D. Wilson; Keewatin, Lieutenant-Governor D. C. Cameron; Ungava, the Archbishop of Montreal.

Board of Directors—William Little, Hiram Robinson, Aubrey White, E. Stewart, H. M. Price, W. B. Snowball, Thomas Southworth, Hon. W. C. Edwards, Hon. Sydney Fisher, R. H. Campbell, J. B. Miller, G. C. Edwards, Dr. B. E. Fernow, Ellwood Wilson, F. C. Whitman, G. C. Piche, Aleck Maclaurin, Carl Riordon, Mgr. Matthieu, Bishop of Regina; A. P. Stevenson, William Pearce, William Power, C. E. E. Ussher, Denis Murphy, C. Jackson Booth, William Price, M. P., J. W. Harkom, A. S. Goodeve, M. P., Senator Bostock, W. C. T. Hall, J. S. Dennis.

Secretary, James Lawler.

Treasurer, Miss M. Robinson.

Assistant secretary, Mr. F. W. H. Jacombe.

SECURING STATE FOREST LANDS

By W. M. HAYS

ASST. SECY. DEPT. OF AGRICULTURE

WE have been so busy with this national forest movement and with this Appalachian movement that we have not looked forward, and we have not thought that possibly we could have other quite as large movements or nearly as large movements in this same forest promotion. I have a suggestion along this line, which is, that by some means, the Federal Government and the State Government co-operate in the broadest way in securing lands that cannot be secured as Federal lands, but can be secured as State lands, and that the Federal Government, possibly by paying a part of the interest on the bonds, encourage the States themselves to purchase the lands. Broadly speaking, there are something like one billion nine million acres of forest in this country, of which less than a hundred and seventy million acres are under the Forest Service. That is something like nine per cent. There are somewhere from ten to twenty millions acres in the hands of the States; but our Forestry Service could not give me anything like a close estimate, because some of these lands have been purchased recently and some are on timber lands that are ceded as school lands.

If we could get some large area of fifty millions or a hundred millions of acres, which would be one-twentieth part of the whole forest area of the country, if we could get some large area purchased by the States, the Federal Government paying a part of the expense, say, half of the interest on the bonds for a given period of years, until the forest became productive so that the States would have an income from them, it might be wise on the part of the Federal Government to do that.

There are many reasons for that, one or two of which I will mention. For instance, suppose the State of Minnesota were to create the forest land; the profit would eventually go to Iowa and South Dakota, and North Dakota, as well as to Minnesota; and if they were grown somewhat at a loss, or as a public enterprise, these other States might properly help in paying the cost. So that if the encouragement of timber-growing is to the advantage of our cities as well as to the States, these cities might help in paying some of this first money, this investment, in some such form. Using the process you use now for those lands you are purchasing in the Forest Service, six dollars an acre, we will say, as an average, and three and a half per cent an acre, will mean only ten per cent or at most twenty per cent per acre that the State and Federal Government would pay. In terms of ordinary appropriation, that would mean about five millions of dollars, at the most, from the Federal Government. So that this is not out of proportion to the ordinary expenditure, and it will look to the taking up of a large area of forest land that there is now no way of taking up in a public way. It would take up a great deal of land that we cannot hope that private enterprise will take up, and will enable the growing of forest crops on that area.

PEOPLE HELPING THE FORESTERS*

BY CHIEF FORESTER HENRY S. GRAVES

THE three big problems of the Forest Service are: Protection of the timber against fire; continuation of forests or reforestation, and development of the natural resources.

And the spirit with which the people are helping us solve these is really remarkable. Not only settlers in the National forests and owners of land adjoining are helping us put into practice our theories, but even the private owners of timber lands have realized that it is to their benefit to preserve the forests and to continue them.

In a few years the loss of timber by fire should be reduced to practically nothing. We have always estimated that \$50,000,000 worth of timber was destroyed each year by fire. Last year, I should judge, it was \$20,000,000 or less. We were fortunate in having only a few fires last year, but still they were big ones.

The co-operation of the people in helping us minimize the risk of fire accounts largely for the big reduction in loss. The Forestry Service is building new trails in the forests, putting up telephone lines, establishing look-outs and taking other precautionary measures. The owners of adjacent lands are following our example. In many places, particularly in the states of Washington, Oregon and Idaho, private owners are spending more money for protection than the Government.

Private owners are also adopting our plan of forest continuation. Not many years ago a forest had been cut down for its timber, the land was left an unprofitable and unproducing waste. Now owners are taking care that new timber will grow where the old stood. When we find it expedient to cut the timber in the national forests we carry out this plan of reforestation. If the scheme were generally adopted no one need fear that the timber supply of the country would ever be exhausted.

In order to encourage forest continuation, the States should see to it that the tax on growing timber is not too heavy. It requires forty years and over for a tree to become of merchantable size, and if the owners are forced to pay a big tax they will not find it worth their while to grow timber and will abandon the scheme.

It is easy to see the value of forest continuation. In the old days the industries and cities depending on the cutting of timber disappeared with the forests. Should the forests be kept growing the industries will live with them.

People have also realized by this time that our protective policy is one of development and we are not meeting with the opposition of a few years ago.

*Address at meeting of the National Forest Supervisors of California and Western Nevada

THE WORK OF THE ASSOCIATION

By HON. ROBT. P. BASS

PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION

WE have entered upon a definite policy of public forestry development. We are still in the very primary stages in the application of forestry to privately owned timber lands. We are in the middle stage of development in regard to the practice of forestry by the various State governments. We are undoubtedly in a critical position in regard to the timber supply in this country. Our use of timber per capita in the United States is greater than in any other civilized country in the world. Our natural resources in that respect are rapidly becoming depleted. Fortunately, we have gradually appreciated the conditions which are to confront us in the future, and if we are to develop an economically sound basis as between the supply and demand of forest products, we must develop the science of forestry to the highest degree attainable. In this, it seems to me that the American Forestry Association can be of the greatest use.

The best development of the science of forestry can only come through the co-operation of all the forces which can be brought to bear to develop that science, namely, the Federal Government, the various State and local governments—that is, the town and county governments, according to conditions in the different communities—and the private owners of timber lands. To bring these various forces together into one co-operative unit is, to my mind, the next fundamental step in the development of forestry in this country, and in that work it seems to me that the American Forestry Association can play a very important part. In order to do this, it needs to extend its scope to reach all parts of the country, to serve as an educational medium through which not only the few interested in forestry, but all those who have any relation to the lumbering interests, and to all the interests which are involved in the produce of our woodlands may be reached and taught how they may best make use of the resources at their hand.

The American Forestry Association has before it, to my mind, a great work, and it is the earnest desire of the men now active in the management of the association to seek the co-operation of as many public-spirited men throughout the country as they can reach in this work. They believe it is a work which will be of real benefit to an enormous number of people in this country, and they want the help of all men who can spread the doctrines for which they stand in carrying out the ideas of scientific and of practical forestry.

WYMAN'S SCHOOL OF THE WOODS

By THOS. B. WYMAN

TO train young men in forestry, as it is actually practiced; lumbering, as done by successful operators; milling, of hardwoods and softwoods, and the woodcraft necessary to properly accomplish forest work, Wyman's School of the Woods was organized at Munising, Michigan, July 1st, 1909. Munising is on the south shore of Lake Superior about midway, east and west, of the upper peninsula, and is recognized as having more contributing timber resources than any city in the State of Michigan.

Large corporations have undertaken reforestation and arrangements have been made to employ the students in this work and in the nursery work auxiliary to it.

Organized forest protection is carried on in these forests as is also cruising and estimating, woods, surveying, mapping, scaling, compass work, camping, etc., in all of which students are drilled by force of requirements.

The only endowment of the school is this huge forest; an endowment of such worth that it can not be over estimated in its influence upon forest education.

In addition, the school maintains comfortable quarters at Munising for the theoretical lecture work, draughting, mapping, etc.

A library of several hundred technical and practical works, a reading table to which come the scientific magazines, trade papers and out-of-door periodicals, and fully equipped lecture rooms and draughting rooms offer opportunities for study and practice. All of the best instruments used in forest work are owned and used by the school.

The great lecture room, the great laboratory, the great library, the great store-house of forest knowledge, is the forest; and in it the students spend every moment possible, for new points are always arising which can best be explained by practical demonstration.

The courses at Wyman's School of the Woods are broad in gauge and are designed to cover the full field of forestry in twenty-four months of actual attendance. Upon satisfactorily completing both the theoretical and practical work students are granted a certificate of efficiency in logging engineering. The course is designed in such a manner that students who are unable to take more than a single year of study should be qualified for positions as rangers, compassmen, etc., at salaries commensurate with the duties and responsibilities of the position.

The full courses are open to graduates of approved high schools and others of business training whose qualifications are satisfactory to the directorate. All subjects are arranged in sequence and as closely to season as possible. Hence, students are allowed to enter at the beginning of any subject.

A summer course, covering ten weeks, is also offered. This course is to offer to those students who are "thinking of forestry" an opportunity to learn, by contact with the forest, the nature of advanced study and of actual work. No special qualifications are required for entry to this course. It is purely an out-of-door training school and the entire time is spent in camp.

THE APPALACHIAN WORK

BY WM. L. HALL
OF THE FOREST SERVICE

THE Forest Service is now practically getting into the routine part of the Appalachian work, and I think this year's appropriation will run over one million dollars. If it should turn out that purchases are to be made in the White Mountain region the Forest Service itself would be in a position to report upon the land. It has examined it to the extent of a hundred thousand acres or so, at a valuation of perhaps from six to eight hundred thousand dollars.

Should it turn out that we cannot purchase lands in the White Mountains this year, then we expect that we will complete examinations in the Southern Appalachians, enough to consume the appropriation of two million dollars which is available for this present year; so that, in any case, we believe it will be possible to use the money which Congress has put into our hands.

When this proposition was under consideration for the ten or twelve years it was before Congress, it was pointed out by those who thought it was unwise that, if this law were passed, we would encounter all kinds of difficulties. It was said, in fact, that it was a scheme of the land grabber; it was a scheme of the speculator, and that when we actually got into the work of acquiring land we would find that the speculator had gone in advance of us and had gathered in the lands, and would turn them over to the Government only at a great profit. We have not found that to be true. In a few cases locally, we have found that men have gathered in considerable bodies of land, expecting, possibly, that the Government would come in as a purchaser eventually.

That has not been hard to deal with. Generally, we have found the land owners have not discounted the action of the Government at all, and are ready to deal with us on a frank and businesslike basis.

The passage of this law, however, did in a measure set acting a certain class of men, men who were very anxious to become closely acquainted with the \$11,000,000, and they have attempted to operate in various ways. Some of them have attempted to impersonate Government officials in filing their options on land; others have attempted to get options in their own names with the idea, of course, of making a good profit; others are endeavoring to show that, as agents, they can save the Government a great deal of money, and also obtain enormous prices for the owners of the land. But, with a stiff backbone against all that sort of thing, we are able to make progress, and we shall undoubtedly be able to make progress, and carry out effectively the law as it was the intention that it should be carried out, and as it was the expectation of the entire country that it should be carried out in a reasonable and businesslike way, doing justice alike to the land-owners who have land to sell and to the whole people whose money was to be used for the purchase of those lands, and only at a reasonable price.

CONSERVATION THROUGH LEGISLATION

BY MRS. DE B. RANDOLPH KEIM.

IN conformity with the promise of his annual message to Congress, the President of the United States, in a more elaborate consideration of the conservation of our national resources in a special communication to that body, stated the issue and the argument in furtherance of this great national movement in support of the best interests of the present and safe-guarding of the necessities of the future. As a basis of argument and interest in advocacy of the conservation movement it may be said the public domain today amounts to 731,354,352 acres, about 70 per cent of the area of fifty years ago, and represents largely mountain ranges and arid or semi-arid plains, the most desirable area having been absorbed. In behalf of the sons of America desiring to go West and establish themselves and children, were passed the homestead and other praise-worthy acts. The lax methods of distribution and the impression by many that the public domain was legitimate prey for the unscrupulous led to the passage of large areas of valuable land and many of our national resources into the hands of persons who felt little or no responsibility for promoting the national welfare through their development. The title to millions of acres of public lands thus went into private hands to the detriment of the interests of actual settlers. The right to recover most of such selfishly if not fraudulently obtained lands has unfortunately ceased by reason of statutes of limitations.

The public lands in former times were regarded as a national asset, to be utilized for the payment of the public debt and as a reward for the soldiers and sailors. Apparently overlooking these purposes immense areas were given away in promotion of schemes of wagon and railroads. As their uses were designed to open the great West to accessibility and settlement they had a reason, but the reckless manner of the bestowal made the well intended project an expensive method of reaching a desirable end. Since the best part of the arable public domain has thus vanished present efforts are directed toward the conservation of the resources of what remains and the prevention of further spoliation.

The object now in view is the maintenance and extension of the forest resources and the enactment of laws amending obsolete statutes so as to retain governmental control over that part of the public domain in which there are valuable deposits of coal, oil, phosphates, etc., and to preserve and control under conditions favorable to the public of lands and water power sites along the streams in which the fall of water can be made to generate power to be transmitted in the form of electricity many miles to the point of its use. In concert with the policy of the national administration the efforts of associations of the people have contributed an important share of effective service by awakening public attention and arousing popular co-operation and

effort. The investigation of violations of the public land laws and prosecution of land frauds have gone far toward calling a halt upon the reckless procedure in the past. The withdrawal of coal lands for proper classification and valuation and the withholding of power sites for the time being opens the way to effective action and results. Within the past year the withdrawal of power sites has been applied to one hundred and two streams or two hundred and twenty-nine per cent more than were covered by previous withdrawals.

The statutes relating to the disposition of the precious metals and lands strictly agricultural are accepted as well adapted to the purpose, but are not suited to existing best public opinion as to the disposition of public lands to private ownership and to prevent monopoly or improper use of these lands or their products. One of the chief causes of the reckless disposition of the public domain in the past has been the lack of classification according to value or use. The U. S. Geological Survey, which has long been in the official contact with the public domain from a scientific and economic viewpoint, after years of exploration, investigation, survey and mapping by expert employees in these respective branches without going further possesses a vast quantity of collected and digested material and applied information. It has the equipment office and field to enable it to promptly extend its operations along up to date lines of public opinion and interest in the conservation of our natural resources. The disposition of agricultural lands as such reserving for different ownership or regulation the coal, oil, asphaltum, natural gas, phosphate or any other non-precious metallic substances is the motive of public policy now proposed. The separation of the title to the surface and the title to mining privileges beneath with the right to use so much of the surface as may be required to operate the subterranean mineral deposits presents a proposition which, it is thought, will compass the exigency of the new situation. To accomplish this and it is proposed in the future to utilize the land laws as they stand for the disposition of agricultural lands and the coal, iron or other minerals beneath to be disposed of by lease or royalty and requiring a fixed amount of development each year with special provisions to prevent monopoly. A duplex system of this character applied to the public lands possessing much novelty may be reached by laws at first experimental and subject to improvement as practical working suggests. The adoption of a system applicable to the valuable water power sites in all the public land states presents difficulties arising out of local sovereignty as affected by territorial governments becoming states. As the power in streams passing through public lands can only be made available by using the lands adjacent for the construction of plants for the generation of power and right of way for the transmission of lines, legislation should be asked imposing such conditions in the disposition of lands so situated as may be necessary both in the creation and utilization of the power. It will be seen the question of conservation of our natural resources as a sentiment or abstract proposition and as an aggressive policy supported by the people along practical lines presents opposite conditions. To accomplish the latter interchange of views and associated effort will prepare the way to the accomplishment of definite results, which can be attained through national legislation.

PRIVATE FOREST OWNERS

By A. D. HOPKINS

OF THE BUREAU OF ENTOMOLOGY

I BELIEVE that the American Forestry Association is capable of rendering great service to the cause of forest conservation in this country. I believe that the people of the country who are directly interested in the forest resources have had enough information on the need and importance of conservation. They have been sufficiently warned of the dire consequences of forest destruction, inundation and erosion. Indeed, there has been too much agitation and activity in the interests of certain restricted federal and State forest legislation, and not enough in the interest of the private owner, who is willing to be converted to the natural ideas, if he could be made to see that they would contribute to the wealth of his county or his State, and, at the same time, pay him.

The private owners want the facts about the best methods to protect and increase and utilize forest crops. In other words, they want to know what to do and how to do it, and if it will pay. These are the people who are in need of information and instruction on the essential facts and principles of successful forest management. The officials of public forests are supposed to know all of those and to be competent to select and carry out the proper conservation policy for the forests in their charge.

Therefore, they are not so much in need of the association, but think that all others who are working on the scientific and practical problems of forest protection or forest management, with a view of demonstrating to the private owners the improved methods which would be to their advantage, should have the association back of them. The products of the privately owned forest are relatively as important to the people of the country as are the products of the privately owned farms, and, therefore, the owner of a forest deserves the same help as that so liberally extended to the owner of the farm.

A large part of the appropriation for forest insect work in the Bureau of Entomology at present is being directed to demonstration of methods of control and to practical instructions by practical men in the field for the direct benefit of groups of private owners in different sections of the country. By dint of very hard work we have met with some success; with the moral backing of an association such as the American Forestry Association, our task would be greatly simplified.

AN APPROVAL

BY HON. ADOLPH O. EBERHART
GOVERNOR OF MINNESOTA

Editor of AMERICAN FORESTRY.

REPLYING to your letter of January 17th, containing a copy of resolutions adopted by the annual meeting of the American Forestry Association and asking for an expression of an opinion from me regarding them, I beg to say that the federal appropriation to which resolution number one refers has resulted in great good to this State. We received \$10,000 last year under a co-operative arrangement, and this amount has enabled the State Forestry Service to do far more than the amount itself would indicate, as it has made possible a larger field force throughout the fire season. The great success of our Forestry Department in controlling fires last year was due in no small measure to this assistance.

With reference to resolution number two, no doubt Minnesota has suffered greatly through an unfortunate situation of taxation of forest lands. In my opinion the custom of taxing growing or standing timber repeatedly is unnecessary, as well as unfair. The state, as a whole, would derive the same revenue through taxing the product after the timber is cut and by so doing would insure permanence of the timber industry. As it is now, the owner of standing timber finds it expedient because of the taxes to cut his timber as soon as possible, and in the cheapest possible manner, thus resulting in waste. The right way to tax forest property is to tax the land itself annually in accordance with its real value. The crop should be taxed but once, and that when cut.

As to resolution number three, while it is undoubtedly important in localities where it applies, it does not particularly affect this State.

As to resolutions four and five, both these subjects are thoroughly covered by the operation of our reorganized Forestry Department, which is encouraging the co-operation of timber owners, and is also carrying on an educational campaign to bring about successful reforestation.

THE 1911 INDEX

The 1911 index for AMERICAN FORESTRY is now ready and subscribers may have it mailed to them by writing for it.

Wireless telegraphy will become a factor in the prevention of forest fires in Montana, if experiments planned by R. P. McLaughlin, forest supervisor, are successful. It is proposed to establish a station and open communication with the wireless plant at the Kalispell High School. If the experiment is successful several stations to be operated in connection with the telephone system already in operation, will be organized.

STATE NEWS

Pennsylvania

Pennsylvania's methods in fighting the San Jose scale, the codling moth and other enemies of fruit trees, have attracted the attention of two of the Southern states in which commercial orchards are being developed. The system adopted has been imitated in others, but now word has been received that men are coming here to see how trees are handled.

An incorporated concern which is working under the direction of Virginia's State Bureau of Economic Zoölogy, has asked State Zoölogist Surface if he can provide demonstrations for men who have been detailed to come to Pennsylvania to observe.

Dr. W. E. Hinds, State Entomologist of Alabama, has written to Dr. Surface asking for an outline of his division's work and for instructions such as are given to the orchard workers.

The Maryland State authorities have also highly commended the Pennsylvania system. This State held twenty-six demonstrations for the killing of scale and moth last year along the same lines as the 900 that are held in this State.

New York

A public hearing was held by the Forest, Fish and Game Committees of the Senate and Assembly on the bill to amend the Conservation Law relating to Lands and Forests, February 20 and 21. The greatest public interest has been manifested in the reforestation policy of Governor Dix and the Conservation Commission, since it promises to restore the forest areas of the state to an extent required by the industrial, commercial, sanitary and recreation needs of a rapidly increasing population. The people are astounded to learn that there are about 2,300,000 acres, eight per cent of the State's total area, which now have no profitable growth. All this is virtually idle soil and should be planted to forest, for which it is best adapted.

The Conservation Commission's bill, now before the Legislature, seeks not only to enlarge the state's authority with reference to the reforestation of public lands, but also aims to encourage tree planting by private land owners.

There are several important changes in the forestry law proposed by this bill, but the two most progressive features undoubtedly are those relating to the regulation of timber cutting on certain private lands, and to afford taxation relief to the owner who reforests denuded or idle soil.

North Carolina

Through the efforts of the North Carolina Forestry Association, which was organized

last February with the specific object of "promoting the protection of the forests of North Carolina from fire and from destructive insects, and of promoting their perpetuation by wise use and by the reforestation of cutover and abandoned lands," two county associations were organized last fall to take up and encourage the work of control of the southern pine beetle, which has latterly become so alarmingly prevalent through the South Atlantic states.

With the assistance of The Greater Charlotte Club, a meeting was held in Charlotte on November 24, at which Messrs. E. B. Mason and F. B. Snyder, of the U. S. Division of Forest Insect Investigations; Mr. J. S. Holmes, State Forester and Secretary of the North Carolina Forestry Association; Mr. W. S. Lee, a Vice President of this Association; and several other local men made addresses. The result was the organization of the Mecklenburg Pine Beetle Association, to assist the farmers and other timberland owners in carrying out the methods of control recommended by the U. S. Bureau of Entomology. The following men were elected officers: Messrs. W. S. Pharr, president; Summers Alexander, first vice president; W. S. Abernethy, second vice president; and Rufus M. Johnston, secretary and treasurer.

It was suggested at this meeting that Mr. E. T. Clark, county demonstrator for the U. S. Department of Agriculture, be secured to mark the trees for cutting at the various places through the county where control operations were to be carried out. Subsequent negotiations have resulted in the permission of the Department for Mr. Clark to do this work.

Two weeks later a similar meeting was held in the adjoining county of Gaston, at which the two above-named entomologists, Messrs. Mason and Snyder, and also the State Forester, were present. The meeting organized itself into The Gaston Forestry Association, the chief object of which was stated to be the control of the southern pine beetle as advocated by the U. S. Bureau of Entomology. Its secondary, though more permanent object, is to support all forestry movements of local interest and value and to co-operate in every possible way with the State Forestry Association. Mr. A. C. Stroup a vice president of the North Carolina Forestry Association was chairman of the meeting and was elected secretary of the county association. The other officers were: W. W. Farries president; R. N. Johnson, first vice president; and J. F. McCarver, second vice president.

New Jersey

The United States Department of Agriculture has notified the New Jersey State For-

est Commission that an allotment of \$2,000 will be made to New Jersey to aid in the work of controlling forest fires during the present year. Last year the State received \$1,000 from the appropriation, which was expended in establishing a fire patrol in the northern part of the state.

California

According to the statements of J. A. Boyle, special investigator of the State Forestry Office, at Santa Barbara, Cal., two investigators are working in the northern part of California making an extensive investigation of the system of taxing timber lands. The investigation is an exhaustive one and will cover all the timber lands in California. It is being made at the request of the National Conservation Commission at Washington, D. C. It is understood that after the investigation in California has been completed, the work will assume a national scope. On account of the vast timber holdings in the northern part of the state, the work is of great importance and will be carried on in a searching and thorough manner.

Forest rangers of the Redlands (California) section have begun planting 15,000 eucalyptus trees on the foothills of the mountains, north of Del Rosa and West Highlands. It is the first eucalyptus planting in the local mountains, but it is expected many more trees will be planted in the foothills in the next few years.

West Virginia

West Virginia forests are said by experts to be remarkable for their extent, their variety, and the number of species of trees. Certainly it is stated that in no other forest area in America can a greater variety in species and size be found. The early settlers of the state, careless of the future, decimated the soft woods in the erection of their homes and in making their "clearings." But the hardwood, better than the soft woods survived the ordeal, and their seedlings are to-day ready for the ax and the saw. The first movement for the systematic and effective conservation of West Virginia's forests was begun twenty-five years ago. Today the state's timber is of enormous value and the buyers from all the world's markets are constantly in the field in an effort to secure it against future consumption.

Michigan

Upper Michigan pine forests are fast becoming a memory, as the lumbermen are contenting themselves with hardwood and hemlock, where in years gone by they would disdain to cut anything but the stately white pine.

The last big tract of pine in Luce county—big as such tracts are nowadays—is being cut this winter by F. Chesbrough and is being banked on the Taquamenon River. It consists of 3,000,000 feet of the finest cork pine. The timber is so located that logging opera-

tions are difficult. It is a 12-mile haul from the camps north of Newberry to the river.

At the big union meeting of teachers and grangers at Hesperia, Mich., in February, Prof. Filibert Roth, of the Forestry Department of the University of Michigan, advocated the establishment of a state bureau of forestry. At the present rate of cutting timber, he said, the state would be stripped of this resource in a short time and a bureau of forestry would tend to educate citizens to plant trees before the state's forests are all gone.

Florida

P. T. Day, of Cleveland, O., the largest naval stores operator in the West, predicted in Savannah, Ga., recently that if the present profligate destruction of trees in Florida is continued that state will be totally denuded of pines in a few years. He said the matter had been brought to the attention of the Department of Agriculture and that the government officials had concurred in his prediction.

Wisconsin

State Forester E. M. Griffith of Wisconsin, returning from a visit to Washington, D. C., says that there is a favorable outlook for the passage of Congressman E. A. Morse's bill to add to the state forest reserves 216 islands in the forest reserve area in Vilas and Oneida counties of Wisconsin. A letter from Congressman Morse gives further encouragement for the success of the measure. The islands contain 167 acres and the state desires to add them to the reserves for their conservation.

Under the terms of the bill, they would be used only for forest reserve purposes if given to the state.

Mr. Griffith secured from the forestry service at Washington an extension of its contract with the Wisconsin Forestry Board for supplying a federal forest patrol to work with the state guardians, the contract involving \$5,000 annually.

Minnesota

To arrange for co-operation between the railroads and the State Forestry Service during the dangerous fire season of 1912, State Forester Cox called a meeting of railroad officials and forest rangers at Brainerd to outline a plan for fire prevention and protection. Although two months or more probably will elapse before the season for forest fires begins, Mr. Cox proposes having arrangements completed for protecting Northern Minnesota when that time arrives. During the dangerous season there will be fifteen rangers and nearly two hundred patrolmen on the lookout to prevent damage by forest fires.

New Hampshire

A systematic campaign against the gypsy moth in New Hampshire has been started by

the state moth department. It is the intention of the state agent to bring every resource to bear against the pest so far as an economical administration of state funds will allow.

It is especially the desire of the moth department to conduct the work for the benefit of the state as a whole, rather than for any one locality, and to make the state funds do the greatest possible service both for the present and for the future. With this in mind, the "scouting" or inspection part of the work has been organized.

Washington

State Treasurer J. G. Lewis, of Washington, has segregated the \$24,111.46 which was the state's share of all receipts from the sale of property, rentals, etc., in the forest reserves in Washington for the year ending June 30, 1911, and the amounts will be distributed among the various counties according to the area of national forests they contain, as compared with the extra area in the state.

Colorado

Failure to secure the appropriation made by the last legislature to provide a horticultural and forest school on the Teller Indian School property may yet lose Colorado the buildings and the grounds valued at \$450,000. President C. A. Lory, of the State Agricultural Board, has written to the local board in charge of the property, advising them of the alleged seriousness of the condition. The property was granted to Colorado by Congress on condition that it be converted into an educational institution to which Indians were to be admitted on equal terms with whites. So far the state has for lack of funds been unable to comply with conditions imposed by the act of Congress, but President Lory believes if the extension work can be carried out as planned, with the \$5,000 promised by the state auditor, the state can retain possession of the property.

Tennessee

Problems arising from the destruction of southern forests by insect pests and fires will be discussed at a forest conference in Nashville, Tenn., April 8-10, at which Henry S. Graves, chief of the Forest Service, will preside.

This conference will be held as a part of the Southern Commercial Congress, which then will be in session. Lumbermen, manufacturers and southern legislators will be invited to participate in the discussions in which legal and other means of forest perpetuation will be considered.

Montana

More adequate laws for the protection of the forests of Montana are needed, and unless the next legislature is prevailed upon to pass stringent fire laws the future of the forests will be in a most precarious condition, is

the opinion expressed by State Forester Charles W. Jungberg in his annual report. He asserts that this protective legislation was not passed last winter because "pressure was brought to bear by interests that hold the main part of the timber outside of the national forests, to defeat all forest legislation."

Kentucky

Advocates of the awakening of interest in forestry in Kentucky have put before the Legislature a proposal that there shall be created a non-salaried commission of five members with the Governor a member of the commission; that there shall be a trained forester whose duty shall be to enlist the interest of private owners of land, to organize a fire warden system, and to develop a forestry policy for the state. It is further proposed that adequate fire protection provisions be enacted, and that the State be authorized to own land for experimental purposes and to reforest denuded watersheds at the sources of important streams.

Indiana

Optimistic reports concerning the good work of the Indiana Forestry Association were made at a recent meeting of the directors of that organization at the office of Charles W. Fairbanks. Mr. Fairbanks was re-elected president, and other officers were re-elected as follows: Vice-president, Mason B. Thomas, Wabash College, Crawfordsville, and secretary, George B. Lockwood, Marion. William A. Guthrie, of Indianapolis, was elected treasurer to succeed Hugh J. McGowan, who died.

In his report, Mr. Fairbanks said the work of the Association had been carried on with gratifying results since its organization. The people generally had manifested interest in the movement, he said, and prospects were very bright. Mr. Fairbanks said the newspapers of the State had done important work in educating the people concerning the purposes of the Association.

Oregon

The Portland, Oregon, office of the Forest Service has recently inaugurated a study of the production and consumption of pulp and pulp products in the Pacific Northwest. This study is now being actively pursued by three representatives of that Government Bureau. All of the pulp mills actively operating are furnishing data regarding their cutting, and information regarding the consumption of paper and other pulp products is being solicited from distributors and consumers.

Ohio

The Forestry Department of the Ohio State agricultural station is hoping its recommendations for legislation requiring the re-

forestation of Ohio woodlands will bear fruit in the present constitutional convention. One proposal introduced by Delegate Miller makes it mandatory for the legislature to protect insectivorous birds and such animals as destroy natural enemies of agriculture and trees. He also would require the legislature to encourage reforestation and make sufficient appropriations for agricultural education. Without waiting for the convention or legislature to act, however, Director C. E. Thorne, of the station, is out co-operating with owners of woodlots to reclaim them for reforestation. The Forestry Department offers aid to any such persons applying for it. "Investigations in thirty Ohio counties," says Thorne, "show that only 15 per cent of woodlots are reserved from pasture."

Massachusetts

State Forester Rane, of Massachusetts, is sending his warning to the owners of woodland in the western part of the State, that they beware of the chestnut tree blight which is making its way eastward from New York and Pennsylvania, where thousands of acres of valuable timber have been destroyed by this new pest.

The advance guard of the pest has already made its appearance in the Berkshires. It is believed that with the advent of warm weather it will sweep eastward and destroy every piece of standing chestnut in the State. A serious financial loss is thereby threatened, for the State Forester estimates the chestnut growth of Massachusetts at more than \$7,000,000.

NEWS AND NOTES

Supervisors Meet

The district supervisors of the Forest Service in California and Western Nevada held a very successful annual convention in San Francisco, starting January 22, at which Chief Forester Henry S. Graves, as well as a number of lesser forestry officials, were present. Representatives of nearly fifty prominent lumber companies and large owners of timber lands attended one of the sessions and held a joint conference with the forest officers. As a result of this conference a number of the leading lumber men and timber owners agreed to take immediate action toward the formation of an association similar to the Western Forestry and Conservation Association. They also organized to aid in protecting the forests from fire, and will work with the Forest Service to this end. Addresses were delivered by Chief Forester Henry S. Graves, Coert DuBois, Assistant District Forester Headley, Supervisors Rogers, Redington, and Rider, F. C. Thompson, Assistant District Forester Woodbury, Swift Berry, J. A. Mitchell, William C. Hodge, Forest Assistant Shaw, John H. Hatten, L. A. Barrett, and a number of others.

District supervisors also held conventions at Portland, Oregon, and Denver, Colo., Chief Forester Graves attending the former.

Chinese Forestry Students

Bound for Germany, where for the next year they will study the science of forestry at an agricultural college, Mr. Arlu Liang, the son of Dr. Cheng Tung Liang Cheng, Chinese Ambassador to Berlin, and his cousin, Mr. Foo Tsu Liang, left this country a few days ago.

The young men each nineteen years old, have been three years in the United States, Mr. Arlu Liang studying at Worcester Acad-

emy and Mr. Foo Tsu Liang at the Massachusetts College of Agriculture. Both have given much of their attention to the study of forest conservation.

Mr. Arlu Liang said that he and his cousin were leaving on short notice, a cable message from his father having arrived telling him to start for Germany on the first steamship available. He said he and his cousin were to study forestry in one of the German agricultural schools, in accordance with a plan formulated by his father.

His father, he declared, was greatly interested in saving the forests of China, where little is thought of forest conservation and where thousands of feet of valuable timber are wasted every year. He declared that it was his father's intention to begin an active campaign for the preservation of Chinese forests as soon as political conditions are tranquil in the country.

Crater National Forest

The Crater National forest is the subject of an interesting treatise by Findley Burns, in a bulletin published by the United States Forestry Service. The topography of the region, the supply of water for power and for irrigation purposes, the "crop" of timber, grazing regulations and settlement are covered quite fully in the bulletin.

It is shown that the forest contains 10,197,000,000 board feet of merchantable timber and is capable of turning off an annual yield of 90,000,000 feet. The water supply which can be conserved in the forest is said to be sufficient to irrigate 240,000 acres in addition to developing large power projects. Practically the whole forest is timbered. The only treeless portions are a few alpine areas on the crests of the higher mountains, some lava beds, mountain meadows scattered here and there, and brush land, the result of fire. Of the entire forest, 70 per

cent is covered with merchantable timber, 20 per cent bears stands of unmerchantable timber, largely young growth, and 10 per cent is grass or brush land and barren areas.

Mr. Sterling's Change

Mr. E. A. Sterling, for some years in charge of the forestry work of the Pennsylvania Railroad, resigned on February 15 and opened offices as a consulting forest and timber engineer at 1331-2 Real Estate Trust Building, Philadelphia. Mr. Sterling is very well known all over the United States as one of its leading foresters thoroughly conversant with all branches of the work and he is expected to make a great success of his new work.

State Land Prices

Junius E. Beal, of the Public Domain Commission of Michigan, writes: "We have just made a step in advance at a meeting of our Public Domain Commission in putting a minimum price of \$2.00 an acre on state lands to be sold. Heretofore a great deal of Michigan land has been sold at a dollar an acre. We will boost it again before long."

Serious Situation

A dispatch from Banning, Cal., says: "One lone ranger remains on duty in the great Angeles national forest north of Banning, and other rangers having been furloughed for the reason that the treasury of the Forest Service is many thousand dollars short of having enough money to pay running expenses.

"The situation in the national forests hereabout is regarded as extremely hazardous, as there are many square miles of fine forest literally at the mercy of fortune. Lack of rain has made the forest very dry and should a fire be started there is no telling when it could be vanquished. The unprotected watershed supplies many prosperous fruit colonies, including Banning, Beaumont, Redlands and the Bear valley water shed, which supplies the Riverside groves."

Want Fire Protection

Strongly urging Congress to preserve intact the \$1,000,000 appropriation for forest fire fighting, the Western Pine Manufacturers' Association went on record at the annual meeting at Spokane, Wash., with a resolution that will be telegraphed to all Senators and and Congressmen of the western states.

The measure, as passed unanimously, recites the disastrous fires of 1910 in Idaho and Washington, tells of the death of 100 men on the fire lines and demands in the strongest terms that the appropriation be made to prevent a repetition of the disaster.

Some fifty manufacturers were on hand when President William Deary, of the Potlatch Company, called the association to

order, and nearly \$50,000,000 of capital invested in timber operations was represented

Preventing Forest Fires

Seeking greater protection from fire in the forest preserves of New York State, the Conservation Commission introduced in the Legislature a bill making it a misdemeanor to start a campfire on or near forest lands without first clearing away the brush and leaves for at least ten feet on all sides; to start a fire on or near forest or brush land and leave it unquenched; or to throw or drop a lighted match, cigar or cigarette into any combustible material without immediately extinguishing it.

The Moth Pest Bogey

Writing of the situation in Massachusetts, Allen Chamberlin says: "Things are certainly looking up in the gypsy moth war. It is a joyful spectacle to see the State forester standing before a committee of the Legislature and asking for a reduced appropriation, and it is no less cheering to hear the Federal Government's entomologist saying that the imported parasites are actually beginning to give an account of themselves. This does not mean that the day has been saved, and that we can lay down our arms in the near future and let the 'bug' go hang, but it does indicate that the seven years of persistent effort and the expenditure of more than two million dollars of State money, together with fully as much more of municipal and private funds, has been to some purpose, and that the greatest danger has been passed."

After the Bark Borer

With the assistance of the Government Bureau of Entomology, Henry Ireland, United States Forest Supervisor from Sumpter, Oregon, is seeking a bug to catch a bug that is destroying the pine forests in the Blue Mountains and other Eastern Oregon districts. The insect which the supervisor is after is commonly called bark-borer. Although it appears in nearly all the forests of the state, it is kept down by natural checks in most localities and it is only in the pine forests of Eastern Oregon that it has become alarmingly destructive. Mr. Ireland said that in one district infested by the borers they had moved southward over a broad area for about 40 miles since 1907, destroying about 40 per cent of the yellow pine timber they attacked.

160,000 Acres Secured

Solicitor George P. McCabe, of the Department of Agriculture, has drawn up the purchase contracts for the 160,000 acres of land bargained for by the Government in the Southern Appalachian Mountains.

Within the next few months Uncle Sam will have a national forest comprising 160,-

600 acres of land, the Government officials and owners having agreed upon the price.

This is just a beginning of purchases to be made under the Weeks law in the Southern Appalachian and White Mountains. Two hundred thousand more acres are now being examined by forestry experts with a view of locating desirable lands for additional purchases.

The lands already purchased will cost the Government about \$1,000,000, the amount provided for purchases the first year.

One Cent a Tree

It costs 1 cent to plant a tree in Canada, according to a report submitted to the International Dry Farming congress by Norman M. Ross, of Indian Head, Saskatchewan, and just published in the annual congress handbook.

Mr. Ross is chief of the tree-planting division of the Dominion forestry department. He states that the Dominion forest nursery station at Indian Head is annually distributing to settlers in western Canada, free of charge, more than 2,250,000 seedlings and cuttings and that, during the last 10 years, the tree-planting division has furnished, roughly, 18,500,000 trees and cuttings to 14,882 settlers, an average of 1,240 to each applicant.

Low Prices for Trees

Efficiency and increased production at the New York State nurseries will enable the Conservation Commission to offer trees especially adapted to reforesting lands in New York State, to private land owners this spring at greatly reduced rates.

These offers should appeal to land owners throughout the State which is so badly in need of reforesting. Careful investigations of the Commission show that there are 2,300,000 acres in the State which are not producing any valuable growth, practically all of which could be profitably used in growing trees.

Chinese Forestry

Large corporations even in China, where the neglect of forestry has been notorious, are now beginning to grow their own timber. Chinese railroads have put considerable tracts in young trees to furnish their lines with ties and trestle timbers. The growth of trees is slow, but it is also sure and the market for forest products continues to increase in proportion to the shrinkage of the supply simultaneously with the expansion of

the demand. It is high time that individuals consider the question of growing their own trees.

Railway Ties

Statistics prepared by the Forestry Service of the United States show that of the 125,000,000 cross-ties bought by the railways last year almost 80 per cent were hewed ties. The sawed tie, while occasionally produced by mills built particularly for this purpose, is more generally a by-product of general lumber operations.

A Wise Action

A timber company which has purchased 250,000 acres of land in Western North Carolina will place the entire tract under the supervision of the United States Forestry Bureau. This is a departure from the methods usually employed by timber companies. It is significant of the advance of the conservation movement.

Another feature of the enterprise will be the complete utilization of all the sawdust and other waste from the several mills that are to be operated.

The Philippine Forests

The most striking element of wealth in the Philippine Islands is the forests. They cover an area of 50,000,000 acres and of that area 40,000,000 acres are untouched and waiting for the American capitalist. In other words, the forests of the Philippines would more than cover the entire New England states, New York and Pennsylvania. Much of the wood is of the most valuable kind. Owing to the remote position of the Pacific island possession and the difficulties and great cost of bringing the woods to this country little has been done, however.

A Laudable Effort

Forest Service men who are blinded or otherwise disabled and the dependants of men killed in fighting forest fires can expect no compensation from the government. To remedy this condition Senator Dixon (Rep., Mont.), is making a sturdy effort to have the Forest Service employees included in the law which awards compensation to victims of hazardous government employment. The law proposes amendments in behalf of employees of the Bureau of Mines and the Forest Service.

EDUCATIONAL

Prof. Roth at Cornell

Professor Filibert Roth has accepted an appointment as professor of forestry and head of the Forestry Department in the New York State College of Agriculture at Cornell University. He moves to Ithaca next summer. This makes the third professorial appointment in forestry at Cornell in about a year. Professor Walter Mulford and Assistant Professor John Bentley, Jr., who are already at Ithaca, will be with Mr. Roth, and the Department plans to give a thorough technical course to students wishing to make forestry their life work. The Department will also continue its plans for university extension work in forestry and the teaching of elementary forestry to general agricultural students and others at Cornell. Professor Roth has been for nine years at the head of the Forestry Department of the University of Michigan. Mr. Roth was at one time in charge of all the national forest reserves under the Land Office.

Each an Officer

The story of the club that was organized with an office for every member, was illustrated at the University of Missouri when the Forestry Society of the University of Missouri, composed of forestry students, was founded. The officers are: E. L. Anderson, Goodwater, president; Victor C. Follenius, St. Louis, vice-president; Murrell W. Talbott, Appleton City, secretary; James Pixlee, Cameron, treasurer. Next summer the students will take a two weeks' camping trip to the Ozarks and will "cruise" the timber lands owned by the University of Missouri, about 50,000 acres. Students will estimate the number of board feet, map roads to get the timber out, and make general observations and notes on the condition of Ozark forests, what varieties flourish best, and how the Ozark forests should be managed to get the maximum return and preserve the forests as valuable assets—conservation in the open.

Forestry for Children

Charles C. Deam, Secretary of the Indiana State Board of Forestry, has announced the annual prize competition, open to school children of the State, for essays bearing on forest subjects. The subject of the essays and the conditions imposed are such that it will be necessary for the children to visit and study woodlands. Prizes aggregating \$40 are to be given. Four \$10 prizes will be given; one to pupils of the seventh grade, one to pupils of the eighth grade, one to freshmen and sophomore high school pupils

and one to junior and senior high school pupils. The subject of the essay is to be "Woodlot Conditions in the County in Which I Live and Suggestions for Their Improvement."

A Course in Forestry

One of the branches of practical work in which the Science Department of the Newtown (Mass.) High School has manifested much interest is the study of forestry, which is being carried on in connection with the botany department. The student learns the kind of soil best adapted for each plant or tree, the proper way to set out these trees, how to insure their successful growth through trimming, and the extermination of various insects and pests. Certain trees are set out and carefully watched by the pupils during their growth. The different kinds of pests which appear are examined and studied in the botanical laboratory. A large tract of land has been set aside by the City Forestry Department for the students to set out trees in and study their growth. Part of the land is to be for forestry and the remainder for a garden.

New Forestry Department

Temporary organization for a forestry club, which is to be the forerunner of a forestry department in the University of California, has been effected. The Board of Regents is to be shown by the interest in this branch that there is need of a school here. A fund has already been appropriated for a forestry professorship. C. S. Robinson has been elected temporary chairman. A committee of six to draft a constitution has been appointed as follows: J. T. Saunders (chairman), Professor Jepson, A. E. Wieslander, W. P. Smidt, William Powell and F. B. Herbert.

At Missouri University

The course of forestry at Missouri University has been so arranged that more than eight months will be spent in practical forest work. A permanent camp will be established in the Ozark Mountains on the university's 50,000 acres of wooded land. This field work is expected to place the Missouri forestry school in the highest rank of such schools. Technical study of the principles of forestry will be given at the university, but training of foresters in such subjects as timber estimating, tree planting, lumbering, forest surveying, logging, roads, trails, fire lines, and working plans, will be given in the woods.

Prof. S. F. Clark, of Williams College, reports that he is on the lookout for a suitable tract of forest land where the students may experiment in forestry.

Syracuse University will establish a State College of Forestry and has engaged Dr. Hugh P. Baker, for some years at Pennsylvania State College, as its head. Dr. Baker is a graduate of the Yale Forestry School and also took a degree at Munich. He is one of the most able foresters in the country and has scored a great success at Penn State.

In the Ranger course of the School of Forestry, Colorado College has achieved a distinct success. This course has attracted a large body of men from the National forests of Colorado and Wyoming. With six weeks of field work, including studies of the growth and development of forest trees

and mapping and estimating timber, the course has been of the greatest practical value.

A Summer Course

In connection with the regular Summer Forest Camp, which is held in the Ozark Region, from June 15 to August 15, the Department of Forestry of the University of Missouri will conduct a Summer Forest School for lumbermen, woodsmen and timberland owners. Short courses will be given in silviculture and the care and protection of forests, in methods of timber estimating, log scaling, rough methods of woods surveying and in laying out logging roads and trails, in timber and topographic mapping and in methods of marking timber for cutting to secure reproduction and for improving the condition and growth of forests.

QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

New York City

Editor, American Forestry:

I notice your having introduced into Congress a bill in reference to the chestnut tree blight. At a recent meeting of lumbermen in Cincinnati we were asked to gather some statistics regarding chestnut and oak lumber and I shall be pleased indeed to have you send me what information you have, more especially upon the subject of chestnut blight.

E. F. PERRY.

Secretary National Wholesale Lumber Dealers' Association.

Pamphlets and reports of various experts mailed to Mr. Perry.—*Editor.*

Westerville, Ohio

Editor, American Forestry:

I am especially anxious to get data relative to State reforestation, the cost of reforestation, proceeds arising therefrom, and any other matter that will be helpful.

MRS. MARY E. LEE.

Experts opinions on these questions mailed to Mrs. Lee.—*The Editor.*

San Antonio, Tex.

Editor, American Forestry:

We have under consideration from an investment point of view the purchase of large

tracts of timber, and in this connection, of course, in the forefront there is the question of supply and demand. Could you give us any data to assist us in the matter and the special demand for mahogany and tropical timber.

THE CONSOLIDATED COMPANY.

Reports on trade supplies and the price lists of lumber at various points mailed to the Consolidated Company.—*The Editor.*

Denver, Colo.

Editor, American Forestry:

In the event that I should set out in my yard in Denver Douglas fir or yellow pine trees of 3 and 4 inches in diameter, in good soil, how long should it be before they would become large enough to be valuable shade trees, would it be within 15 to 20 years?

G. E. BARTLETT.

About fifteen years. Would advise Douglas fir as a shade tree.—*The Editor.*

New York City

Request by Mrs. George S. Smith, 301 West 67th Street, for information regarding the culture of the Persian (English) walnut tree.

This is now being answered by Mr. E. R. Lake, of the Bureau of Field Investigations in Pomology.

CURRENT LITERATURE

MONTHLY LIST FOR FEBRUARY, 1912

(Books and periodicals indexed in the Library of the United States Forest Service)

Forestry as a Whole

Jacquot, A. La forêt; son rôle dans la nature et les sociétés. 324 p. Paris, Berger-Levrault, 1911.

Proceedings and reports of associations, National and State forest officers, etc.

India—Forest department. Review of forest administration in British India for the year 1909-10. 49 p. Simla, 1911.

Junta central de bosques y arbolados de la Republica Mexicana. Revista forestal Mexicana; boletin mensual, v. 1, no. 1-12. Mexico, Imprenta y fototipia de la Secretaria de Fomento, 1909-10.

Mexico—Secretaria de Fomento—Direccion general de agricultura. Boletin, pt. 3: Revista forestal, v. 1, no. 1-4. Mexico, 1911.

Royal Scottish arboricultural society. Transactions, vol. 26, pt. 1. 163 p. pl. Edinburgh, 1912.

South Australia—Woods and forests department. Annual progress report upon State forest administration in South Australia for the year 1910-11. 12 p. pl. Adelaide, 1911.

Western Australia—Woods and forests department. Annual report for the year ended 30th June, 1911. 10 p. pl. Perth, 1911.

United States—Department of agriculture—Forest service. January field program, 1912. 32 p. Wash., D. C., 1912.

Forest Education

Forest schools

India—Imperial forest college, Dehra Dun. Progress report for the year 1910-1911. 26 p. Calcutta, 1911.

Forest Legislation

United States—Congress—House-Committee on agriculture. Agricultural appropriation bill; hearings, Forest service, Dec. 18, 1911. 68 p. Wash., D. C., 1912.

Forest Botany

Trees, Classification and description

Lambert, W. A. Trees and how to know them; a manual with analytical and dichotomous keys of the principal forest trees of the south. 46 p. il., pl. Richmond, etc., 1911.

Woods, classification and structure

Hough, Romeyn B. American woods, pt. 12. Lowville N. Y., The author, 1911.

Silvics

Studies of species

Ashe, W. W. Chestnut in Tennessee. 35 p. Nashville, 1912. (Tennessee—Geological survey. Bulletin 10-B.)

Pearson, G. A. The influence of age and condition of the tree upon seed production in western yellow pine. 11 p. Wash., D. C., 1912. (U. S.—Department of agriculture—Forest service. Circular 196.)

Forest experiment stations

India—Imperial forest research institute. Progress report for 1910-1911. 28 p. Calcutta, 1911.

Japan—Department of agriculture and commerce—Forestry bureau. Contributions concerning forest investigations, no. 9. 160 p. pl. Tokio, 1911. (In Japanese.)

Sweden—Forstliche versuchsanstalt. Mitteilungen, heft 8. 302 p. il. Stockholm, 1911.

Silviculture

Broilliard, Charles J. B. Le traitement des bois en France; estimation, partage et usufruit des forêts. 3d ed. 685 p. Paris, Berger-Levrault, 1911.

Planting

Great Britain—Royal commission on coast erosion and afforestation. Third and final report of the royal commission appointed to inquire into and to report on certain questions affecting coast erosion, the reclamation of tidal lands, and afforestation in the United Kingdom. pt. 1-2. London, Published by His Majesty's stationery office, 1911.

Forest Protection

Insects

Tkachenko, M. Prusskoe lyesnoe khozyaistvo i shelkopryad "monashenka." (Prussian forestry and the "nun" moth.) 67 p. St. Petersburg, Russia, 1910.

Hopkins, A. D. The dying hickory trees; cause and remedy. 5 p. il. Wash., D. C., 1912. (U. S.—Department of agriculture—Bureau of entomology. Circular 144.)

Hopkins, A. D. Insect damage to standing timber in the national parks. 10 p. Wash., D. C., 1912. (U. S.—Department of agriculture—Bureau of entomology. Circular 143.)

Diseases of trees

Gifford, C. M. The damping off of coniferous seedlings. 31 p. il., pl. Burlington, Vt., 1911. (Vermont—Agricultural experiment station. Bulletin 157.)

Massachusetts—State forester. The chestnut bark disease. 10 p. pl., map. Boston, 1912.

Forest Management

Foster, J. H. Improving the farm woodlot. 1 p. Durham, N. H., 1912. (New Hampshire—Agricultural experiment station. Press bulletin 11.)

Foster, J. H. Report on the forest lands of the State hospital for the insane, Richland co., S. C. 11 p. Columbia, S. C., 1912.

Hawes, Austin F. The management of Vermont forests with special reference to white pine. 43 p. il. Burlington, Vt., 1911. (Vermont—Agricultural experiment station. Bulletin 156. Forest service publication no. 4.)

Forest Economics*Statistics*

Macmillan, H. R., and others. Forest products of Canada, 1910; lumber, square timber, lath and shingles. 39 p. Ottawa, 1911. (Canada—Department of interior—Forestry branch. Bulletin 25.)

Macmillan, H. R., comp. Wood-using industries, 1910; agricultural implements and vehicles; furniture and cars; veneer. 42 p. Ottawa, 1911. (Canada—Department of interior—Forestry branch. Bulletin 24.)

United States—Bureau of the census. Cross-ties purchased, 1910. 8 p. Wash., D. C., 1912. (Forest products no. 8.)

United States—Bureau of the census. Poles purchased, 1910. 7 p. Wash., D. C., 1912. (Forest products no. 9.)

United States—Bureau of the census. Pulpwood consumption, 1910. 10 p. Wash., D. C., 1912. (Forest products no. 1.)

United States—Bureau of the census. Slack cooerage stock, 1910. 8 p. Wash., D. C., 1912. (Forest products no. 3.)

United States—Bureau of the census. Tight cooerage stock, 1910. 12 p. Wash., D. C., 1912. (Forest products no. 6.)

United States Bureau of the census. Veneers, 1910. 6 p. Wash., D. C., 1911. (Forest products no. 5.)

United States—Bureau of the census. Wood distillation, 1910. 5 p. Wash., D. C., 1911. (Forest products no. 7.)

Forest Administration*National and State forests*

National forest reservation commission. Report. 1910-11. 8 p. Wash., D. C., 1911.

Forest Engineering

Clark and Lyford. Forest surveys; what they are, wherein they serve, what they cost. 12 p. Montreal, Desbarats printing co., 1911.

Forest Utilization*Lumber industry*

Otis, McAllister & Co. Maderas de comercio de California, Oregon, Washington, Estados Unidos. 17 p. il. San Francisco, Cal., 1912.

Yellow pine manufacturers' association. Yellow pine; a manual of standard wood construction. 96 p. il. St. Louis, Mo., 1911.

Wood-using industries

Bond, Francis M. Forest products laboratory series; progress report on wood-paving experiments in Minneapolis. 19 p. il. Wash., D. C., 1912. (U. S.—Department of agriculture—Forest service. Circular 194.)

Oakleaf, Howard B. Washington's secondary wood-using industries. 8 p. Seattle Wash., Pacific lumber trade journal, 1911.

Simmons, Roger E. The wood-using industries of Illinois. 164 p. tables. Wash., D. C., Forest service, 1911.

Wood technology

Cline, McGarhey. Forest products laboratory series; strength values for structural timbers. 8 p. Wash., D. C., 1912. (U. S.—Department of agriculture—Forest service. Circular 189.)

Auxiliary Subjects*Conservation of natural resources*

New York—Conservation commission. Annual report, 1st, 1911. 33 p. Albany, N. Y., 1912.

Irrigation

National irrigation congress. Official proceedings, 19th, Dec. 5-9, 1911. 359 p. Chicago, R. R. Donnelly & Sons Co., 1912.

Periodical Articles*Miscellaneous periodicals*

Agricultural journal of the Union of South Africa, Dec. 1911—The rain tree of Peru once more, p. 712-14.

Bulletin of the Pan-American union, Jan. 1912.—The cacao of the world, p. 75-85.

Gardners' chronicle, Dec. 16, 1911.—The removal of tree stumps, by A. J. Bliss, p. 440.

Gardners' chronicle, Dec. 30, 1911.—Experiments in regard to thinning, by H. Rogers, p. 468; The removal of tree stumps, by F. G. Brewer, p. 476.

Gardners' chronicle, Jan. 6, 1912.—Street trees in Canada, p. 3.

- Journal de la jeunesse, Oct. 21, 1911.—L'homme destructeur et les forêts Américaines, by Pierre de Mériel, p. 526-30.
- National wool grower, Jan. 1912.—Relation of forest to flockmaster, by A. F. Potter, p. 19-21.
- Review of reviews, Feb. 1912.—A great living tree museum, by Chas. M. Dow, p. 203-8.
- Revue horticole, Jan. 16, 1912.—L'Arnold arboretum by D. Bois, p. 28-32; Le Washingtonia robusta en Tunisie, by L. Guillochon, p. 38-9.
- Science, Jan. 12, 1912.—Tier-like arrangement of the elements of certain woods, by Samuel J. Record, p. 75-7.
- Scientific American, Dec. 23, 1911.—Artificial silk; making lustrous yarn from wood pulp, by H. W. Ambruster, p. 576-7.
- Scientific American, Jan. 13, 1912.—Watching for and preventing forest fires, by D. A. Willey, p. 41, 48, 56.
- Torrey, Jan. 1912.—Undescribed species of Cuban cacti, by N. L. Britton and J. N. Rose, p. 13-16.
- Trade journals and consular reports*
- American lumberman, Jan. 27, 1912.—Substitute woods for pencil manufacture, by H. S. Sackett, p. 46; Application of forestry science to the lumber industry, by A. Cary, p. 66; A remarkable wire rope-way, by J. A. Seager, p. 73-4.
- American lumberman, Feb. 3, 1912.—Uniform inspection of crossties, by R. D. Lusk, p. 42-3; Timber resources of Santo Domingo republic, p. 44-6; Forestry in the southern hardwoods; address before Hardwood Manufacturers Association, by W. B. Greeley, p. 54-5; Forest service supervisors in conference, p. 66.
- American lumberman, February 10, 1912.—Imitation of high priced furniture woods, p. 42; A possible utilization of yellow pine stumpage, by M. Cline, p. 47-8; Conservation, by J. B. White, p. 48-9; Best methods of getting lumber from tree to car, by C. E. Slagle, p. 49-50; Modern manufacturing of maple flooring, p. 68-9.
- Canada lumberman, Jan. 15, 1912.—Extravagant lumbering; time to halt, p. 30-1; Cost of sawing mill waste products, p. 31-3; The timber trade in Great Britain, p. 36-7; Patrol and fire fighting, by F. J. Davies, p. 43.
- Canada lumberman, Feb. 1, 1912.—Progress of forestry in Canada, by H. R. Mac-Millan, p. 65, 70, 72.
- Carriage monthly, Jan. 1912.—Seasoning of timber for wheels, by W. P. Kennedy, p. 92-4.
- Engineering magazine, Dec. 1911.—Preservation of timber; treating of crossties, by W. F. Goltra, p. 433-6.
- Field & Stream, Jan. 1912.—Gifford Pinchot's report on Forestry to the Camp Fire Club; Feb. First article of series on American Forestry.
- Hardwood record, Jan. 25, 1912.—African cedar, p. 35; Boxwood and its uses, p. 36.
- Hardwood record, Feb. 10, 1912.—A new tropical hardwood, p. 49.
- Journal of electricity, power and gas, Feb. 3, 1912.—Preservation of power transmission poles, by W. R. Wheaton, p. 92.
- Lumber world review, Jan. 25, 1912.—The influence of the big sawmill, by R. S. Kellogg, p. 28-9.
- Lumber world review, Feb. 10, 1912.—The Biltmore forest school, p. 26-7.
- Pacific lumber trade journal, Jan. 1912.—Review of the forest protection campaign, by E. T. Allen, p. 43; Complex problems of by-product utilization, by C. H. Shattuck, p. 60; Past year witnesses first electrical logging, by E. J. Barry, p. 113.
- Pine cone, Feb. 1912.—A history of white pine, p. 1-2; Forestry and fire protection, p. 3-5.
- Pulp and paper magazine, Jan. 1912.—Use of native woods, by R. G. Lewis, p. 13-14; Mould growth on wood pulp, by F. Barnes, p. 27-9.
- Railway and engineering review, Jan. 20, 1912.—Treating seasoned vs. unseasoned ties, by F. J. Angier, p. 63.
- St. Louis lumberman, Jan. 15, 1912.—Problems to be solved in utilization of wood waste, by W. B. Harper and others, p. 52-3; Forestry of a railroad, p. 83.
- St. Louis lumberman, Feb. 1, 1912.—Wood, the peerless building material, by A. Hamilton, p. 53.
- Southern industrial and lumber review, Jan. 1912.—Lumber selling opportunities abroad as reported by our American consuls, p. 13, 17, 91; Unlimited raw material for paper in United States, by C. W. Lyman, p. 79-80.
- Southern lumberman, Jan. 20, 1912.—The production of the wooden crosstie, by A. R. Joyce, p. 33; Wood preservers in three-day convention, p. 33-34; Cutting and seasoning timber, by A. Meyer, p. 34.
- Southern lumberman, Jan. 27, 1912.—Specifications and analysis of creosote oils, by H. von Schrenk, p. 43-4.
- Timberman, Jan. 1912.—Plan for maintaining uniform speed in handling logs on steep ground, p. 26; Influence of the Panama canal on development of lumber industry, by J. N. Teal, p. 33-5; The Panama canal and its influence on Pacific coast forest products, by J. H. Bloedel, p. 35-6; Railroads open up hitherto inaccessible central Oregon timber wealth, by J. M. Lawrence, p. 39-40; Successful construction and operation of five mile log flume in Idaho, by W. D. Starbird, p. 46; Proposed steel vessel, capacity 2,000,000 feet, for the lumber trade, by J. Dickie, p. 47-8; Utilization of by-products, by C. H. Shattuck, p. 52.
- United States daily consular report, Jan. 24, 1912.—Red mangrove bark in Madagascar, by J. C. Carter, p. 385-7.

- United States daily consular report, Feb. 8, 1912.—Sale of crossties abroad; Germany and England, by R. P. Skinner and J. L. Griffiths, p. 598-600.
- United States daily consular report, Feb. 12, 1912.—Canadian pulp and pulp wood, by F. M. Ryder, p. 650-2.
- Wood craft, Feb. 1912.—The design and construction of historic console tables, by J. Bovington, p. 127-9; The woods used in the finishing department, by A. A. Kelly, p. 129-32; Winter quarters of the Biltmore forest school, p. 134-5; Wooden shoe making in Europe, by F. W. Mahin, p. 159.
- Wood worker, Jan. 1912.—Making wooden shoe pegs, p. 42.
- Forest journals*
- American forestry, Feb. 1912.—The progress of forestry, by R. P. Bass, p. 75-81; Opportunities for foresters, by A. Cary, p. 82-94; The present situation in forestry, by H. S. Graves, p. 95-104; The annual convention and resolutions, American forestry association, p. 133-4; The progress of forestry in Wisconsin, by E. M. Griffith, p. 107-17; Unlimited raw material for paper making in the United States, by C. W. Lyman, p. 118-22; Two features of forestry; the part that colleges and experiment stations may play in its development, by F. W. Rane, p. 123-8; The American mental attitude on conservation and its growth, by B. A. Johnson, p. 130-2.
- Bulletin de la Société centrale forestière de Belgique, Jan. 1912.—Chêne rouvre ou chêne pédonculé, by Ney, p. 1-9; Commerce d'importation et d'exportation des bois en 1910, p. 9-20; Influence de l'ombre et de la lumière sur l'épanouissement des bourgeons du hêtre et de quelques autres feuillus, by P. Jacard, p. 21-6; Utilization de l'azote de l'air par les plantes, by T. Jamieson, p. 26-44.
- Canadian forestry journal, Nov.-Dec. 1911.—The future of British Columbia lumbering, by J. F. Clark, p. 157-9, 163; Forestry and the lumber business, by J. E. Rhodes, p. 164-8.
- Centralblatt für das gesamte forstwesen, Nov. 1911.—Die wälder Dalmatiens, by L. Adamovic, p. 491-506; Bemerkungen zur gattung Pseudopolygraphus, by W. Baer, p. 506-8.
- Centralblatt für das gesamte forstwesen, Dec. 1911.—Zur bildung von mittelzahlen, by N. von Lorenz, p. 541-58; Eschenholz zu ski, by G. Janka, p. 558-85.
- Forest leaves, Feb. 1912.—Tree planting in New Zealand, by H. D. Baker, p. 101-2; Coppice growth and the chestnut tree blight, by T. L. Hoover and S. B. Detwiler, p. 102-4; Forest instruments by Pennsylvania foresters, p. 106-7; Practical work on the woodlot, by C. H. Goetz, p. 107-8.
- Forestry quarterly, Dec. 1911.—The Yale transplanting board, by J. W. Toumey, p. 539-43; The rise of silviculture, by Jentsch, p. 544-56; Winter reconnaissance in Californian mountains, by R. F. Hammatt, p. 557-62; The hand-loggers of British Columbia, by L. Margolin, p. 563-7; Rotation of cutting to secure a sustained yield from the crown timber lands of British Columbia, by L. S. Higgs, p. 568-73; Report of committee on forest fires, Canadian forestry association, p. 577-88; Canadian volume tables, by E. Wilson, p. 589-94.
- Forstwissenschaftliches centralblatt, Jan. 1912.—Weglauglossen, by Knauth, p. 1-10; Die herstellung forstlicher bestand-sübersichts- und wirtschaftskarten by T. Glaser, p. 10-27.
- Indian forester, Jan. 1912.—The expenditure on forests in India and its relation to the revenue realized, p. 1-17; Departmental teak extraction in the Zigon Division, Burma, by E. V. Ellis, p. 18-27; A new species of mildew, by A. L. Chatterji, p. 28-30; Neglected rubbers; how Hevea has ousted all the other varieties, p. 34-8; The legend of the rain-tree, p. 38-40.
- North woods, Jan. 1912.—The work of the service, by D. P. Tierney, p. 4-7; The duties of a patrolman in the State service, by W. Kueffner, p. 9-12.
- Philippine agriculturist and forester, Sept. 1911.—Lumbering in Bataan, by F. Franco, p. 132-4.
- Quarterly journal of forestry, Jan. 1912.—Growing larch for profit, by A. Slater, p. 1-11; Tree guards, by E. R. Pratt, p. 11-13; The Monterey pine in Brittain, by planting, by C. P. Ackers, p. 20-2.
- Revue des eaux et forêts, Jan. 1, 1912.—Les frais de régie et de surveillance des bois communaux, by F. Lombard, p. 4-11; Le mouvement forestier à l'étranger; Suisse, by G. Huffel, p. 11-15.
- Revue des eaux et forêts, Jan. 15, 1912.—L'initiative du contre-feu, by J. Dinner, p. 33-5; Forêts coloniales; la forêt d'Analamazaotra, by Louvel, p. 35-48.
- Zeitschrift für forst- und jagdwesen, Dec. 1911.—Die witterung in Eberswalde im jahre 1910, by J. Schubert, p. 907-16; Blättergewicht und blattflächen einiger buchen, by E. Ramann, p. 916-19.



JOE BEACH, FOREST RANGER, WITH A LIVE WOLF ON HIS SADDLE, TAKING IT INTO CAMP SO IT COULD BE PHOTOGRAPHED AFTER RECOVERING FROM ITS WOUNDS, BUT IT DIED.



TWO COYOTES CAUGHT IN TWO TRAPS BURIED UNDER THE SNOW IN THE LEADVILLE
NATIONAL FOREST, COLORADO.

American Forestry

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THE WAR ON PREDATORY ANIMALS

By PERCIVAL S. RIDSDALE

"**H**E was the biggest grizzly I ever saw. He reared up about fifty feet from me and kept coming. I pumped seven shots into him, the last one when he was so close that his blood spurted over me, and he fell dead at my feet." This is the modest statement of forest ranger Dwight L. Moody in describing the killing of the most famous grizzly known on the eastern slope of the Rockies. Moody accomplished what hundreds of men had failed to do in years of trying and, had the last shot not been effective, he probably would not have lived to tell the tale.

This grizzly weighed 1450 pounds, more than a large horse, and for nearly twenty years had been hunted in vain by ranchers and rangers. It is estimated that he killed stock worth \$2,000 a year and in the twenty years of his depredations cost the ranchers and stockmen some \$40,000. Is it any wonder that they wanted him killed, spent days in trying to get him, and finally offered rewards amounting to \$800 to the man who bagged him?

Old Toto, as he was called, roamed in the southern section of Utah, in what is known as Dixie Land, and he waxed wise, and fat in his many years of high living and sagacious raids upon the stock. Many parties were organized in an effort to hunt him down but all failed, although some claimed to have gotten shots at him at too great a distance to be effective. Finally, in 1907, the ranchmen were so harassed by his persistent killing,—the old brute was wise enough to usually select tender two-year-olds,—that they appealed to the Forest Service to help them in getting Toto. Dwight L. Moody, a ranger who is an experienced hunter, was assigned to the job with an indefinite leave of absence from his regular duties.

"I'll get him," he said when he started, with several days' provisions and a 30-30 Winchester. This gun is a repeating rifle carrying seven cartridges. Three days later Moody made good.

He came upon Toto's big trail the first day out, followed him for two days into the heart of the mountains and late on the third day overtook him. Toto was in a thick scrubby growth of quaking aspens, on a hilly slope. He had apparently been asleep, for he jumped up suddenly as Moody approached, stood on his hind quarters and saw the ranger fifty feet away. Moody is a

quick and a sure shot. He fired as the big bear arose to his towering height and the bullet struck rather high in the shoulder. With a terrific roar of pain and rage Toto charged down the slope, slashing at the aspens with his fore paws. These aspens were from three to four inches in diameter, and close together, yet in his charge Toto tore through them and snapped them off as if he was rushing through a field of corn.

Moody fired steadily, and as it was afterward found every shot took effect in the neck, shoulders or chest. Some knocked Toto down or staggered him, but they did not stop his deadly charge and with blood pouring from his wounds and wild with rage he lurched onward until, when Moody fired the last shot in his magazine, putting the bullet through Toto's brain, the blood from the wounded bear spurted over him and he had to jump back to avoid being crushed as Toto fell dead at his feet.

THE NEED OF EXTERMINATION

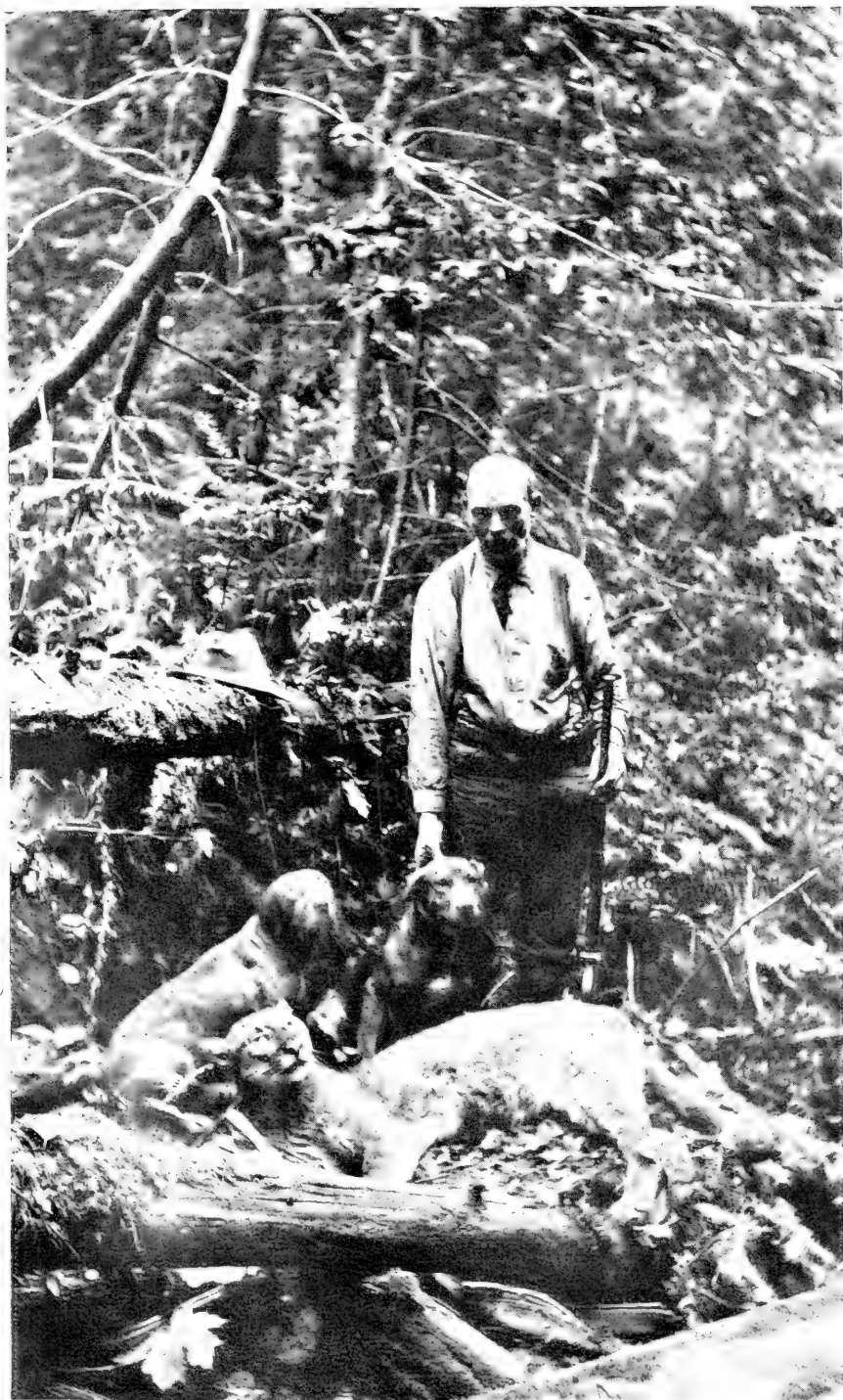
This is but one of the many thrilling stories told of the adventures of forest rangers in their persistent fight to exterminate predatory animals, yet the records of these thrilling escapes from death, these daring attacks, or prolonged hardships, are not found in the records of the Forest Service. It is no part of the duty of the brave and hardy rangers to exploit themselves. All they do is to report the number of animals killed and to tell how region after region is now being rid of the animals that prey upon the stock and the property of the ranchers and the farmers.

That the extermination of these animals is necessary is evident when it is stated that Toto killed, it is estimated, \$40,000 worth of stock; that a full grown wolf will destroy about \$1,000 worth of stock a year, and that the average family of wolves will get about \$3,000 worth yearly. Mountain lions, lynxes, wild cats, coyotes and others are almost equally destructive. It is estimated that in Wyoming and Montana wolves kill from fifteen to twenty per cent of the increase in the herds. They usually select the calves and yearlings for slaughter, but if these can not be had cows, and often full grown steers are attacked and killed.

The problem of exterminating these predatory animals is one that calls for determined and persistent labor by men who are skilled hunters, who thoroughly know the country in which they operate and who are familiar with the habits of the wild animals. Bullets, traps and poison are used and the rangers have done most effective work. Thousands of animals have been killed and already several districts have been entirely ridden of these beasts of prey.

THE ANNUAL KILL

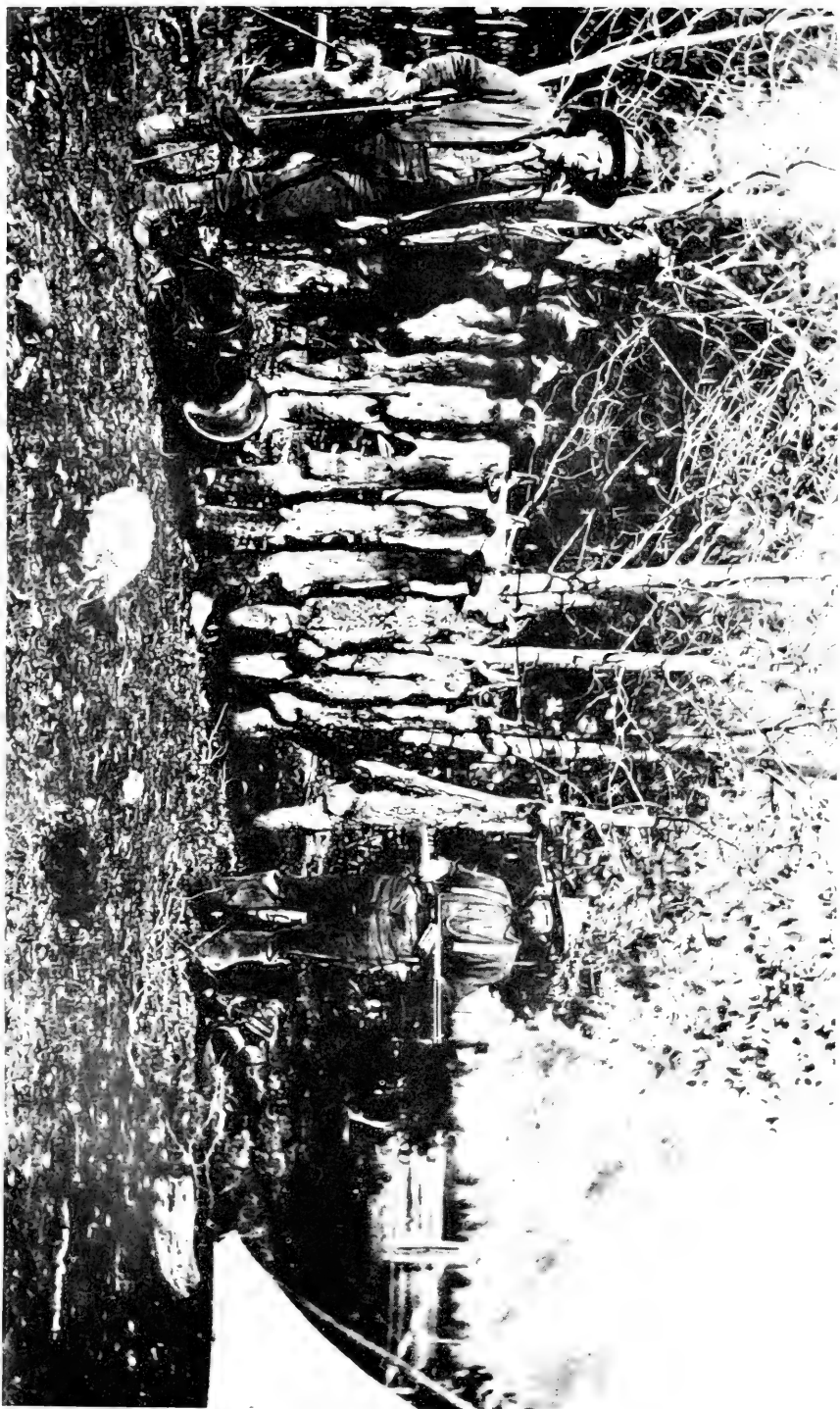
In the report of Chief Forester Graves for 1911, it is shown that in the states of Arizona, California, Colorado, Idaho, Minnesota, Montana, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming 7,971 animals harmful to stock and to game were killed. These



FOREST RANGER AND A MOUNTAIN LION HE HAS TRAILED WITH TWO
DOGS AND KILLED.



FOREST HUNTER AT HOME SHOWING THE SKINS OF SOME OF THE LARGER PREDATORY
ANIMALS ON AN OREGON NATIONAL FOREST.



A PILE OF COYOTES KILLED BY A HUNTER ON ONE OF THE NATIONAL FORESTS OF IDAHO.



EAGLE IN A STEEL TRAP, LEADVILLE NATIONAL FOREST.



FOURTH

READY FOR SHIPPING, LEADVILLE FOREST, COLORADO.

included 213 bears, 88 mountain lions, 172 wolves, 69 wolf pups, 6,487 coyotes, 870 wild cats, 72 lynxes, 2 wolverines, and 6 foxes.

It is interesting to note that only one animal was killed in Minnesota. a bear. 1,430 were killed in Idaho and 1,432 in Utah. Most of the wolves were killed in New Mexico, most of the bears in Oregon, most of the mountain lions in Arizona, and most of the coyotes in Colorado, Idaho, and Utah.

Chief Forester Graves says: "The total number killed was 12.5 per cent less than in 1910. There was a falling off of 21 per cent in the number of bears, 10 per cent in the number of mountain lions, 53.5 per cent in the number of wolf pups, 11 per cent in the number of coyotes, 25 per cent in the number of wild cats, and 45 per cent in the number of lynxes. There was, however, an increase of 25 per cent in the number of grown wolves killed. These reductions are probably due to a general reduction in the number of predatory animals infesting the National Forests and adjacent ranges.

"The work has served as an example and a stimulus to the settlers within and adjacent to the forests, who have themselves killed many thousands of animals. On the Wallowa National Forest, in Oregon, the spread of rabies among the coyotes during the summer of 1910 caused widespread apprehension and resulted in serious losses of live stock. At the request of the settlers, the district forester assigned several of the best qualified forest officers in the State to the work of destroying the coyotes. They were so successful that this spring some of the permittees allowed their lambing bands to graze unattended throughout an entire day without suffering any loss whatever from wild animals, a condition practically without precedent in the history of the country."

SOME MORE THRILLERS

Many of the rangers are famous hunters and in any ranger's camp or at a rangers' meeting in the west the visitor may be entertained, as long as he desires to hear them, with stories of thrilling experiences. Few of the rangers, being modest men, will talk about themselves and the most famous are usually the most reticent, but they tell about the adventures of each other with eagerness. One of the best known, Jim Owens, who worked in the Kaibab National Forest district, is one of the most reticent of men. He killed 52 mountain lions along the Grand Canyon section in one year and when asked to tell of his experiences said, "I just shot 'em."

Some of their adventures are amusing as well as thrilling. Harold S. Pierce, supervisor at Sheridan, Wyo., and two assistants, were examining timber in a mountain section. They were armed with note books and fountain pens, when, at a spot thirty miles away from the nearest town, they saw a bear, a cub. Foolishly they tried to capture him, although they knew his mother must be close by. He ran into some underbrush, and following they almost ran into the arms of his mother. She did not wait for an introduction. The nearest tree was 100 yards away and it was not a big one at that. Pierce thinks he did the distance in less than ten seconds and he was the last to arrive, with the bear so close behind that she almost annexed a section of his trousers as he shinned up the tree. They had the pleasure of looking down upon the bear until nightfall when, in disgust, at their exclusiveness, she departed.

A few days later Pierce and his companions returned with their artillery and soon enjoyed some fine bear steak. They found the little cub had a sister and took the two back to Sheridan, where they still are.

Charles J. Byers, a ranger, once crawled into the den of a mountain lion, became wedged in the passage, killed the lion and had to be hauled out with ropes. Byers tracked the lion to his den, down a steep mountain side. Tying a rope to his waist and lighting a torch he crawled on his hands and knees fifty-five feet into the den. There he stuck. He was in danger from the animal and also from suffocation, as his body filled the passage. He kept the torch alight, however, until he saw the lion's eyes, aimed a little below them and fired. Fortunately for him he killed the lion instantly. Then he extinguished the torch. His partner, following him down the mountain, found the rope and after much pulling, aided by Byers' twisting and squirming, he finally got the ranger out of the den, much scraped and scratched but otherwise unhurt.

Many of the animals are now killed by poison, that being found most effective, especially with wolves and coyotes. A number of these animals are also caught in traps, but poison easily stands first as a means of exterminating them. Of this plan, John A. Rhodes, an experienced ranger, says: "Its advantage lies in the ease and rapidity with which it can be handled. Where the labor of a half a dozen men would be required in setting and watching a line of traps, one man could easily cover the same country with poison. The greater the number of baits the greater the chances for killing.

"For bait fresh rabbit meat is the best, but if this is not to be had boiled ham, fresh liver, mutton or beef tallow, bacon or quail are fair substitutes. The quail, if broiled, and the breast meat used is almost equal to the rabbit. Never poison anything containing a bone. Never touch the bait with the hands or any part of the body.

"Strychnine is the best poison. Ordinarily, as much as can be held upon the point of a large blade of a pocket knife will prove fatal to any animal. This quantity should be put in the center of a cigarette paper, the sides of which must be gathered together around the poison and the ends securely tied, forming a capsule. Dip the capsule in a can of melted mutton or beef tallow, using wooden tweezers to handle it with, and hold it there until it is well coated and then drop it into a long necked bottle. When the bottle is well filled with capsules you cork it tight so that the contents will not be exposed to barn or house odors.

"Each of the poisoned capsules is put in a piece of meat, which, in turn, is dropped into a fruit jar and shut up tight. Every precaution must be taken not to touch the meat with anything that will leave an odor. Always drop the bait from a horse, leaving it in some place where coyotes or wolves cross or travel.

"Never dismount, but take particular note of the position of each bait. Deposit the baits in the afternoon and gather them up in the morning. Do not leave them out all day."



DEAD CHESTNUT TREE IN FOREST ON SKYUKA MOUNTAIN NEAR
TRYON, N. C., MARCH, 1903.



REST ON SKYUKA MOUNTAIN NEAR
MARCH, 1903.

RELATION OF INSECTS TO THE DEATH OF CHESTNUT TREES

BY A. D. HOPKINS

IN CHARGE OF FOREST INSECT INVESTIGATIONS
BUREAU OF ENTOMOLOGY, U. S. DEPARTMENT OF AGRICULTURE

THE history of the discovery of the chestnut blight disease in this country and its rapid development from a local to a State and Interstate problem is well known. The history of extensive dying of chestnut throughout its range from Vermont to Mississippi and the relation of insects and other factors to the primary cause is, however, not so well known. It appears that there are a number of agencies of destruction other than this new chestnut blight disease which must be taken into consideration and investigated before the problem of protecting the chestnut can be solved.

Investigations have shown that there must be other specific diseases and we know that there are a number of insects which have been the direct or indirect cause of the death of a large percentage of the chestnut over extensive areas in which the new chestnut blight disease is not known to occur. When we review the history of unhealthy and dying chestnut during the past half century, it is surprising that there are any living trees left within the natural range of the species. In fact, there are not many left in some sections of the Southern States where it was abundant fifty years ago.

REPORTS DURING THE LAST CENTURY

We have the statement of Mr. C. F. Smith a resident of Stanley, North Carolina, that in 1845 there was a large amount of healthy chestnut in the State and that about that time it started to die very rapidly, that there was considerable chestnut in 1865, but at present there is very little left except on steep northern slopes.

We find a note in *Science* of December 29, 1911, crediting a statement to Professor Eugene Hilgard of Berkeley, Cal., to the effect that he found in the northeastern part of Mississippi, in 1856, that the chestnut trees of that region, both young and old, were dead.

In an appendix to a report of the Geological Survey of North Carolina, 1873, Mr. William C. Kerr, stated that "the chestnut was formerly abundant in the Piedmont region, down to the country between the Catawba and Yadkin rivers, but within the last thirty years they have mostly perished. They are now found east of the Blue Ridge only on higher ridges and spurs of the mountains."

A correspondent at Sanford, Tenn., in a letter dated October, 1901, stated that the chestnut was threatened with complete destruction in some parts of the country, and that a timberman found on a 100-acre tract only one living tree out of possibly 400.

A trouble affecting the chestnut near Grange Camp, Va., was investigated by Messrs. Wm. H. Ashmead and F. H. Chittenden, of the Bureau of Entomology, in June, 1892. They found that a vast majority of the second growth chestnut, some of it as much as 18 inches in diameter, was dead or seriously affected and dying. After a careful examination of many dead and dying trees, and of two living ones scarcely showing the evidence of disease, it was made quite evident that the primary cause of the destruction of the trees was the two-lined chestnut borer.

The extensive dying of chestnut trees in the southern Appalachians was verified, in 1904, by observations of Mr. W. F. Fiske, of the Bureau of Entomology, during a special investigation of the subject. In his report he states: "In the region immediately south of Tryon, N. C., (which appears to be typical of a very large region extending in an irregular strip from somewhere in the central portion of North Carolina and Georgia) practically all of the chestnut had died so long before as to have disappeared except for the old stumps, a few logs, and an occasional struggling sprout. In a region north of Tryon the chestnut was in a perfectly healthy condition, but in the immediate vicinity of Tryon the trees were then dying by the wholesale, old and young alike." My own observations in the southern and middle Appalachians during the past ten years have convinced me that there has been a widespread destruction of the chestnut of that region, and that the chinquapin has also suffered.

In the *Journal of Science and Arts*, 1846, it is stated that the chinquapin died in the period from June to September, in the vicinity of Riceboro, Ga., in 1825 and was still dying in 1845. I am informed by an old resident of Virginia that the once abundant chinquapin of southern Virginia and northern North Carolina disappeared quite suddenly about fifty years ago.

CHESTNUT INSECTS

In addition to these significant historical records, I may say that the insects of the chestnut forest trees have been the subject of general investigation by the West Virginia Agricultural Experiment Station and the Bureau of Entomology, U. S. Department of Agriculture, since about 1893. The published and unpublished records of these investigations show that 354 species of insects were found to inhabit the chestnut trees. We also find that other observers have recorded 164 species. By eliminating all duplicate records, the total is 472.

All of these insects are not destructive, but among those that are, we have found one species that is perhaps as important as all of the others combined. It has, therefore, been the subject of more investigation and consequently we know more about its habits and the methods of controlling it. It is the so-called two-lined chestnut borer, a small, elongate beetle which flies in May and June and deposits its eggs on the bark of living and dying chestnut, oak, beech, and ironwood in the Southern, Middle and Eastern States. The elongate, slender larvæ mine in the inner bark and outer wood in such a manner as to girdle the trees. When they have attained their full

growth they transform to the adult stage in the water and at birth to emerge the following spring and repeat the process. Our investigations have shown that this is the most destructive insect enemy of the chestnut and oak, and that it can be controlled by disposing of the material trees in such a manner as to destroy the beetle in the main trunk during the fall and winter seasons.

WOUNDS AND THE LIVING BARK

Investigations of the Forest Entomologist of the U. S. Department of Agriculture have made available much of the material on wounds resulting from the activities of the organisms which are responsible for the bark disease and how it kills the trees. They have shown that the spores and their way to the living tissue through some sort of wound is getting in the bark of the trunk, branches and twigs and that the majority of such openings appear to be caused by bark-boring insects. It has been stated by the Forest Entomologist that in many parts of the country where the disease is prevalent 90 per cent of the infection by the chestnut blight disease is due to a primary wound in the living bark made by bark-borers. Recent investigations by Mr. Daugherty in Pennsylvania and examination of specimens submitted to us by the Forest Entomologist at Washington tend to verify this general statement. It is found that a large number of species of insects are more or less responsible for making a primary wound through which the spores of the disease may find entrance to the living tissue and thus result in a weakened condition or death of the tree which in turn contributes to the multiplication and spread of both the disease and the insectiferous element.

It is therefore evident that we have an insect problem of perhaps equal importance to that of the blight itself. The Forest Entomologist as well as the Forest Pathologist has made what we believe we can assume as definite conclusions as to the most economical and effective methods of combating these two agencies of destruction. Indeed, the eradication of insects and chestnut blight presents a new and complicated problem which will require a great deal of exact scientific investigation before we shall be warranted in formulating conclusions as to any specific attack or method of control and prevention.

CONCLUSIONS AND RECOMMENDATIONS

The importance of having the best information that can be secured on the whole subject of insects in their relation to the chestnut has led to the undertaking of an extensive investigation under a special project of the branch of Forest Insects of the Bureau of Entomology. This investigation will be conducted in all parts of the country where the chestnut is or has been an important forest tree and especially in the States and sections where the people representing the private municipal and State ownership consider a special interest in this phase of the problem. These efforts can render a service to their State by public recognition of the work and by offering such

facilities and assistance as will contribute to the value of the final results, because the results will be available to them and to the people of their State.

Under the head of methods of procedure towards the protection of the chestnut from its insect enemies, I may say that in our work on the destructive insect enemies of the Rocky Mountain and Pacific Slope regions, it has been forcibly demonstrated that any direct attempt to control or prevent widespread depredations by insects without a knowledge of the essential facts about the depredator and of the peculiar methods necessary for its control will result in failure and a waste of energy and money. It has been shown that with action based on results of investigation, and a consequent knowledge of the fundamental facts and principles involved, more can be accomplished with a few hundred dollars than with many thousands of dollars without such knowledge. Therefore, in taking up any new problem the expenditure of public funds should be first directed to the determination and dissemination of authentic information before any attempt is made to get practical results. In other words, practical application must follow and not precede scientific investigations and expert advice, just as legislation for the control of forest insects, to be effective, must follow, and not precede, education on the principles and methods of control.

It should be noted in this connection that the chestnut is not the only tree of the eastern forests that is suffering from insects and other enemies. The hickory, the black locust, the oak, the hemlock, and the pine, have their distinctive enemies and in some localities in every State one or more of these tree species have been practically eliminated from the forest.

It is natural for the owner of a forest or the general public to assume that, because of the enormous number of insect and other enemies of forest trees, there can be no practical method of controlling extensive depredations or of preventing losses from their ravages. Such an assumption is, however, far from correct, even in the case of the most destructive species.

HOW TO CONTROL DEPREDATORS

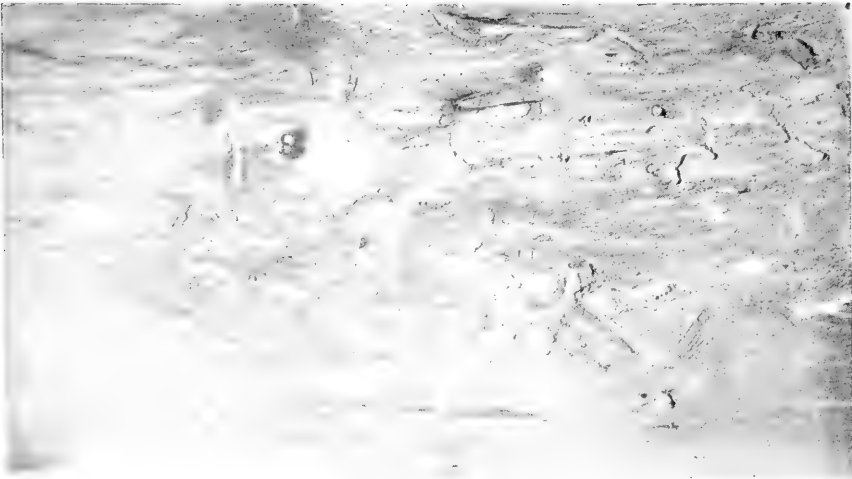
Recent demonstrations in the western forests and our extensive observations in all parts of the country have shown that in many cases it is entirely practicable to control insect depredators and save millions of dollars at an ultimate cost which is comparatively insignificant.

The steps towards the successful protection of forest trees from their insect enemies are:

1. Investigations to determine the essential facts about the principal insects which are capable of killing trees.
2. Concentration of the investigations on the most important species to determine their seasonal history and habits, and the most economical and effectual methods of preventing serious depredations by them.
3. Dissemination of authoritative information on the essential facts and principles of control and prevention, by means of circulars, press notices, lectures, special field instructions, and field demonstrations.



A DYING AND A DEAD CHESTNUT TREE NEAR TRYON, N. C., SUMMER OF 1904.



WORK OF TWO LINED CHESTNUT BORER
IN INNER BARK OF LIVING
CHESTNUT.



A DEAD CHESTNUT TREE NEAR TRYON, N. C.,
1904.

4. Practical application of this information by the owners of affected and threatened timber under strict adherence to the recommendations.

In conclusion I wish to say that in our general investigations and practical demonstrations, we have recognized that the State and Federal Governments can render the greatest service through investigations and the dissemination of information and that it is the owner who should make the practical application. Therefore this chestnut problem is the people's problem and especially that of people who are owners of valuable natural or cultivated growth. It seems to me that the only way the successful protection of the chestnut resources of the country can be brought about will be through individual and co-operative action by the owners. They are the ones to be directly benefited, financially and otherwise. I am sure that, as a rule, they are anxious and willing to do everything they can afford to do if some one will show them how and demonstrate to them that, as a business proposition, it will pay. They will then not only try to protect their own timber but will realize that there is a common interest involved and will be impelled to help their neighbors, their County, and their State.

THE BUSY RANGER

Under the spreading pinyon tree
 The Ranger station stands;
 The Ranger, a busy man is he,
 With Economy and Working Plans,
 And the many things he ought to do
 Far more than fill his hands.

His form is lean and lank and long,
 His face is like the tan,
 His brow is wet with bloody sweat,
 He does whate'er he can,
 He looks the User in the face,
 And owes not any man.

Hour in, hour out, from morn till night,
 You hear his Oliver go,
 You can hear him pound the keyboard black,
 With measured pound and slow,
 Like a sexton ringing the village bell,
 When the evening sun is low.

The children coming home from school
 Look in at the Station door,
 They love to see the Ranger man,
 And hear the Ranger roar,
 And catch his burning words that fly,
 Like chaff, from the Station door.

Working—planning—economizing—
 Thus through the year he goes;
 Each quarter sees a new Plan begun,
 Each quarter sees its close.
 A whole lot planned, and some of it done,
 Has earned a night's repose.

—From *Apache National Forest News Letter*.

THE UNDERGROUND WATERS OF NEW MEXICO*

By WILLARD E. HOLT

A BUDDING historian of the twentieth century has recently declared that one of the smiling valleys of New Mexico was the original "Garden of Eden" and that off-shoots of the original apple tree are still bearing fruit. Partial proof of this was established in my mind this year, when I saw apple trees springing from the parent root full three centuries old and still bearing fruit.

New Mexico is surely fulfilling the Scriptural prophecy: "And the desert shall be made to rejoice and blossom as the rose." Isaiah might have been speaking of our region when he referred to roses, for nowhere under the canopy of heaven do flowers grow more luxuriantly than in the great Southwest.

For some reason, as yet unexplained by science, rainfall in the North and East has been gradually lessening for the past decade, and farmers, who for years have harvested abundant crops, have been forced, against their will, perhaps, to agree with a statement recently made that shrewd, hard-headed farmers are turning their attention to western farms. Naturally, they want to improve water as well as land conditions. In other words, they want to be their own rain-makers. In order to do this they must come to the states where irrigation is practiced.

Government projects and the reclamation service appeal very naturally to people and it is not my purpose to dissuade any one thus inclined from making full and exhaustive examination into any and all projects now in operation or to be hereafter promulgated by our generous Uncle Sam.

It is well, however, that all people should know that it takes real money and lots of it for one to succeed on any reclamation project where the initial cost runs into millions. Men with money, brains and energy will succeed on these projects, even though the cost of obtaining title to the land ranges from \$45.00 to \$70.00 per acre, with a perpetual tax for maintenance of community ditches added.

Intelligent farmers are coming to the irrigation idea as the only reliable get-rich-quick scheme without a penalty attached. With the "Back-to-the-soil" movement there comes a land-hunger and water-thirst that can only be supplied by states like New Mexico. People who have never traveled the length and breadth of this mighty Southern Empire can scarcely realize that we have 4,000,000 acres of land under our beautiful turquoise sky with an available water supply, as specified by surveyors, and for which applications to the Territorial Engineer have been made with but 750,000 acres now irrigated, according to Engineer Miller's report. This estimate includes the largest irrigation project in the world, now being constructed at Elephant Butte, down to the smallest valley consisting of only a few thousand acres.

The peopling of this grand domain, where health, opportunity and opulence await the man who says: "I will," is going forward with rapid

WILL F. TRENKLE, 2,000 GALLONS PER MINUTE FOR IRRIGATION FOUR MILES EAST OF
DUMING, N. M.





IRRIGATED CANAL SUPPLIED BY WELL PUMPING 1,800 GALLONS OF
NEAR DEMING, N. M.

irresistible strides and the true American spirit. The best civilization of our country is joining the forces of Nature in building a commonwealth that will be the peer of any in the Union, and with climatic conditions surpassing them all.

New Mexico has successfully practiced irrigation since the latter part of the sixteenth century, so that we claim nothing new except improvement in method.

HALF A MILLION ACRES

Aside from the area that has and can be reclaimed by harnessing our rivers and streams, we have nearly a half million acres of the richest soil in America, that is, or may be successfully irrigated by underground waters pumped from shallow depths, thirty-five to one hundred feet. Of this vast area, not over five per cent has been put under cultivation, but that five per cent has demonstrated to the world the absolute guarantee of wealth vouchsafed to the man who pins his faith upon the magic of the pump, has the cash or credit to buy the pump and applies himself with energy and intelligence. In every county of the new State there are areas that are being or may be reclaimed at enormous profit by the now proven system of pumping for irrigation.

At Roswell, in the great Pecos Valley, where hundreds of artesian wells tap the underground waters, and many pumps are also in use, there have been shipped this year over 8,000 carloads of the finest orchard and field products in the world, worth not less than \$3,000,000, to say nothing of trainloads of livestock, wool and cotton. This is relatively true of the whole of the great Pecos Valley, whose 1911 alfalfa product alone is worth almost a million dollars.

A single pumping proposition near Roswell includes 13,000 acres, with twenty-eight miles of electric transmission lines connecting the motor-driven pumps. The residents of this beautiful city say that apple orchards in that vicinity are cheaper now at \$1,000 an acre than they will ever be again.

The Portales region can boast the largest central irrigation power plant in the United States, where farmers are pumping on the coöperative basis, the original cost being \$35.00 per acre, but the cost of maintenance has thus far been but \$1.50 per acre. The longest transmission line does not exceed eighteen miles and the acreage that will eventually be reclaimed will exceed 150,000. Everything, except citrus fruits, is grown in great abundance and a fine beet sugar factory will soon add value to the area. It might be added right here that New Mexico sugar beets, like her fair women, are the sweetest in the world.

The Estancia Valley is doing wonders around Willard and Estancia, through the magic of the pump, where the cost of an acre-foot of water is about \$1.75, their products this year show 1,200 pounds of beans per acre, 200 bushels of potatoes, with other crops in proportion, and truck farming producing \$300.00 per acre or better, which latter fact applies to all our valleys.

At Almagordo, the pump is also becoming a great factor in profitable farm development.

THE ALBUQUERQUE REGION

The Albuquerque region, and in fact the whole Rio Grande Valley, is starting on an era of prosperity through the instrumentality of lifegiving water, pumped from the earth, to give necessary moisture for plant growth. There are a number of small irrigation wells in the vicinity of Fort Bayard, the largest army sanitorium in the United States, if not in the world. Speaking of sanitoriums, it may be truthfully stated that New Mexico is one great sanitorium, where health makes wealth easier and where Nature has been most lavish in her gifts to men.

The Mimbres Valley is located in the southwestern part of the state and lies largely in Luna County. It is surrounded on every side by mountain ranges which effectually protect it from severe storms, an approach to a cyclone never having been known. Its level area is well described in a recently published report of Hon. Charles D. Miller, Territorial Engineer, which says:

"Estimates of the possibilities of this valley place the figures of irrigable area from wells producing from 500 to 1,200 and even 1,500 gallons of water per minute at 100,000 acres. To this area it is conservatively estimated that there may be added 100,000 acres irrigated from wells producing 500 gallons down to possibly 200 gallons of water per minute."

The valley has an underground basin filled with water filtered for many miles through sand and gravel, rendering it the purest body of water in America. The Government analysis last year of the water used by the Deming City Water Works, which is a part of this underground flow, gave 30 parts total solids, chiefly magnesia and iron, to 100,000 parts of water. Without chemical treatment of any kind this water is used for every purpose, scientific or domestic, and is applied direct from the pump with absolute safety to every form of plant life which means everything in the vegetable kingdom, outside of citrus fruits. Its quantity may be most easily and quickly understood when we say the report of a Government engineer in charge of irrigation investigations, this year, said: "If 300,000 acre feet were withdrawn from the underflow in one year, a condition almost impossible, it would lower the water plane below but 3.5 inches."

From this underground sea more than 200 pumps, ranging in volume from 200 to 2,000 gallons per minute, are truly making the desert blossom as the rose.

Using the Mimbres Valley as a leading exponent of pumping for irrigation, we submit the following facts: Relinquishments from present holders of land may be obtained for from \$5.00 to \$25.00 per acre. Unimproved deeded land may be purchased for from \$15.00 to \$100.00 per acre, the price being regulated to a certain extent by the distance from Deming, the chief market town of the valley, and chief railroad center of New Mexico. Tracts of five

to twenty acres, improved with water developed, may be purchased, close in, at \$125.00 to \$150.00 per acre.

Cost of wells and pumps: A well, pump and 35 H. P. electric motor, sufficient to successfully irrigate 150 to 200 acres, costs \$2,300 to \$2,600. The same well costs from \$400 to \$600 more when driven by a 40 H. P. gasoline engine, a crude oil engine being slightly more expensive than either, which is overcome by a cheaper operating expense.

Cost of putting water on the ground: Getting right down to brass tacks, in order that a child may understand and computing the cost of 100 or more large and small successful pumping plants, it costs a half cent to pump 1,000 gallons of water, a season's irrigation, costing from \$3.00 to \$9.00 per acre, according to the amount of water required for various crops and the skill of the irrigator. These figures are based on electricity at 3 cents per K. W., engine naphtha at 12 cents, and crude oil at 6 cents per gallon, and with the increasing consumption all of these products are getting cheaper.

Plowing and irrigation are carried on every week in the year, and in most of the market gardens, vegetables are grown the year 'round. Winter irrigation for spring and summer crops is gaining in favor.

*From an address at the National Irrigation Congress.

THE LARGEST SASSAFRAS TREE

By ADIOLA GRAY

SEVERAL months ago the statement was made by the Department of Agriculture that the largest sassafras tree in the world grows in the yard of the First Methodist Church in the city of Atlanta, Ga. According to the reckoning of experts this tree is more than one hundred years old. It is fifty feet high and has a spread of more than forty feet. Printed reports conflict as to the size in circumference; one giving it as seven and a half feet, and another as being eleven feet.

The discovery has recently been made that there is a tree of this species growing on the farm of James M. Jenkins, near Glendale, Hardin Co., Ky., which is much larger. The height and age of this tree have not been reckoned, but it has a circumference of fifteen feet one-half foot above the ground, and is fourteen feet in circumference eight feet above the ground where the first limb is given off. Judging from the great size of this tree it must be even older than the one growing in Atlanta.

To provide for carrying out an agreement under which South Dakota school lands will be exchanged for National Forest land of equal area and value, President Taft has signed a proclamation which makes it possible for the State to select immediately 60,143 acres of land from the Harney and Sioux National Forests.

WINDBREAKS: THEIR INFLUENCE AND VALUE

A REVIEW OF FOREST SERVICE BULLETIN 86, BY CARLOS G. BATES

BY GEORGE L. CLOTHIER

THIS publication fills a long felt want and is the most exhaustive treatment of the subject of windbreaks ever attempted in this country.

The magnitude of the investigations made by the Forest Service as a basis for this bulletin may be appreciated when it is known that the extent of branching of the various species was determined from measurements of 1319 plantations. The effect of plantations on evaporation was learned from 865 hourly readings of evaporimeters. The observations were distributed through the months of June, July, August, and September, 1908.

The horizontal extent of tree roots into cultivated land adjacent to the windbreaks was determined for 152 groves representing eight species. Effects on temperature were derived from 30 readings, and crop yields were studied in 12 fields.

The bulletin is divided into four parts. Part I is a synopsis of the conditions which the study attempted to measure. Part II is a record of the measurements of the physical factors entering into the problem with interpretations of the physiological effects of these factors upon animal and plant life. Part III deals with the timber production of windbreaks and shows how to assess their cost against the land they have damaged and occupied. Part IV summarizes the protective value of windbreaks and calculates the profitable area to devote to windbreaks of various species. Specific recommendations for planting in the several regions needing windbreaks are found in the concluding pages of the bulletin.

The study was carried on chiefly in the States of Kansas and Nebraska, although some measurements were made in Iowa and Minnesota. The season chosen for the study proved to be more humid than the average with less wind in the summer months than usually occurs in the region, hence the effects observed may be taken as underestimates rather than over estimates of the influence of windbreaks.

The study showed that a windbreak may be both beneficial and harmful to the crops of an adjacent field. The observations showed that for the summer months a windbreak may reduce the mechanical force of the wind, lessen evaporation, stagnate the air or reduce its velocity, increase extremes of temperature both in the air and the soil, and change the distribution of moisture in the soil. In studying both beneficial and harmful influences, measurements and observations made in and near the windbreaks were compared with measurements made far enough away to be outside of the influences. The distances through which the effects of the plantations were manifested were measured in all cases in terms of height of the trees, since both beneficial and harmful effects are directly proportional to the height of the trees.

PIECES OF SAND BLOWN OUT OF THE BED OF THE COLORED RIVER, SHERMAN CO. WY.





NARROW BELTS OF EUCALYPTUS ARE PLANTED ABOUT THE ORANGE ORCHARDS OF CALIFORNIA TO PROTECT THE FRUIT TREES FROM THE WIND.

The shading effect expressed in percentages is recorded as though it were concentrated on a strip equal in width to the height of the trees, and since the shaded area is often wider than the trees are high, it often happens that the figures for shade exceed 100 per cent. This method of calculation is likely to confuse the reader, and yet it is difficult to suggest a better one. Shading effects were measured by exposing solio paper in the shadow and comparing its change of color with exposures made in direct sunlight.

METHODS OF OBSERVATION

Soil moisture determinations were made at depths of 10 to 20 inches and at intervals from each windbreak of 10 or 20 feet to the limit of the activity of the roots; and from these measurements it was easy to calculate the distance and intensity of the sapping effect of the tree roots. The greatest benefits arising from windbreaks are believed to result from reduced evaporation, due to reduced motion of air currents. To measure the intensity of evaporation, evaporimeters were set up at distances of one, two, and five times the height of the trees on both sides of the windbreaks and in addition at ten and twenty times the height on the leeward side.

The study of the shading effect revealed the fact that cottonwood is least damaging to crops and honey locust most, with boxelder, willow, mulberry and Osage orange following close behind the honey locust. Cottonwood also has least extent of roots in proportion to its height, and hence has least sapping effect on the soil. It was found that all kinds of trees planted in rows oriented east and west do less damage to crops than when planted in rows oriented north and south and on the other hand trees planted in rows north and south grow faster than in rows east and west. Rows running north and south absorb more light than rows oriented east and west. Alfalfa, corn, and kaffir corn are damaged less by shading than other crops. Damages from shading may be lessened by planting in the shaded area forage crops whose value does not depend upon ripening of their seeds and by planting in the windbreak narrow crowned trees. Sapping effect can be reduced by cultivation to retard evaporation, by deep plowing to cut off the side roots of the trees and by improvements in the fertility and permeability of the soil. Uncultivated Osage orange hedges extend their roots 60 per cent farther than cultivated.

The theory of the farmers that trees impoverish the soil as far as their roots extend was tested by a number of soil analyses. The analyses showed that there was less available nitrogen in the zone of greatest root activity than in the open field, but this reduction corresponded in position with the zone of least moisture in the soil. Since the total nitrogen in the soil permeated by the most active tree roots did not appear to be any less than that found out beyond the influence of the trees, it was concluded that the reduced moisture content had retarded bacterial action and prevented the transformation into available nitrogen of the nitrogen compounds of the soil. The deficiency of available nitrogen probably results measurably in temporary sterility of the soil.

Comparison of wind in the open with that prevailing at a point distant from the windbreak on its leeward side five times the height of the trees showed the velocity of the wind reduced 80% by the most efficient windbreaks. The most obvious effects of this great reduction of wind velocity are to prevent damages to crops by storms and to save the soil from being borne away. Before the general planting of Osage orange hedges in Chase County, Kansas, about 30 years ago a storm caused soil drifts to form several feet deep which still can be seen. The reduction of evaporation due to a decreased velocity of the wind is proportional both to the density and height of the windbreak, and the protective influence increases with increased wind velocity. The zone of greatest protection moves outward from the windbreak with increase of wind velocity and the width of the protected belt becomes wider. The belt of efficient protection averages two times the height of the trees to windward and ten times to leeward. If the trees are 50 feet tall they will protect a belt 600 feet wide. The percentages of moisture saved varied in the observations from 12 to 40 per cent.

It was discovered wholly unexpectedly that windbreaks possess great value as heat regulators. All temperatures studied ranged upwards from the initial temperature for growth, namely from 41° F. The highest daily temperatures and the lowest nightly temperatures occurred at the place where the windbreak retarded the movement of the air the most. The superheating and cooling effects were increased by increasing wind velocity, and decreased in cloudy or rainy weather. It is probable that the effect at night during the growing season is always beneficial by retarding transpiration and thus checking the cooling effect of evaporation upon the leaves. Since photosynthesis does not take place in the absence of light, transpiration during the night could have no beneficial physiological effect; hence any influence that will retard transpiration during the hours of darkness must be a beneficial one. The superheating of the atmosphere in the daytime is most important in the spring and fall when the supply of heat is lowest. Soil temperatures were highest in the zone of greatest protection during the season of increasing temperature and lowest at the same point during the season of decreasing temperature. The author concludes that the summation of the diurnal and nocturnal effects during the growing season is a positive quantity, and hence the average effect of a windbreak is to increase the available heat to the plants growing in the protected zone. The effect of the superheating of air and soil over the protected belt is to create hothouse conditions on a large scale at the season when the plants need all the heat they can get. Measurements of increased yields of corn attributable to superheating effect showed a gain in one field of 40 per cent in the zone of most efficient protection and a gain of almost 15 per cent at a distance to leeward of ten times the height of the protecting trees.

Although some orchardists claim that windbreaks are harmful, it is certain that their effects in Nebraska in the season of 1908, were beneficial.



LOMBARDY POPLAR PROTECTING AN ORCHARD IN THE WEST.



CYPRESS IN CALIFORNIA MAKES AN EXCELLENT
FOR THE PROTECTION OF CITRUS ORCHARDS.

Protected orchards yielded from five to ten times the fruit that was borne by exposed orchards, the damage to the fruit crop having been caused by a cold northwest wind in April accompanied by precipitation. The distribution of the fruit on the trees and through the orchards proved that the April storm from the northwest was responsible for the killing of the fruit buds and for the small crop of apples where windbreaks were not present. Wind accompanied by precipitation is very trying to vegetation because the rapid evaporation of the moisture on the leaves and branches consumes heat in large quantities and depresses the temperature of the plants to a harmful extent.

The curves and tables referring to temperature would seem to indicate that the heating and cooling effects of windbreaks practically balance each other except in the area occupied by the trees. The investigations did not take cognizance of the times either at night or in the winter when the normal temperatures of the air fall below the soil temperatures. At such times, the reduction of wind movement in the protected zone would cause the air temperatures to rise because of radiated heat coming from the soil, hence the effect of the windbreak would be to cause heat to accumulate in the air of the protected area. This effect would be to prevent frosts rather than promote them.

THE FINANCIAL BENEFITS

In measurements of the direct financial results and timber yields, this bulletin presents the first effort on the part of an investigator to ascertain the damaging effects of windbreaks outside of the area belonging to the trees, and to charge the plantation with the occupation and use of the land so damaged. For instance, an Osage orange hedge a mile long oriented north and south and 31 years old is charged with the use of 3.54 acres of land in Table 23. In some of the earlier publications of the Forest Service, single rows of trees were considered as not occupying any space, and the acreage of blocks and belts was computed from measurements from outside row to outside row. In small groves and narrow belts the error from such measurements often exceeded two hundred per cent. It is gratifying to note that the Service has at last worked out accurate and scientific methods for obtaining the value and yield of small farmers' plantations.

The acreage occupied by single rows one mile long was computed by the formula, $A = \frac{CF \times H \times \frac{3}{5} \times 5280}{43530}$ where A represents acreage, CF the factor of damage to corn in percentage of height of trees, H the height of the trees, and the factor 3-5 is assumed to be the average damage during the whole life of the trees, it being conceded that the damage during the early growth of the plantations was very much less than their present measured damage. The formula can be used for single rows of any length provided the actual length in feet is substituted for the number 5280. If the acreage occupied by a belt a mile

long is to be calculated, the width, D between outside rows of the belt must be added and the formula becomes $A = \frac{(D + CF \times H \times \frac{3}{8}) \times 5280}{43560}$

Calculations of the market values of the timber were based upon stumpage prices of \$10.00 per thousand board feet for saw logs and \$2.00 per cord for firewood. Fence posts were valued at 5cts. to 24cts. each according to kind and quality. The prices allotted to fence posts are conservative except for cottonwood and soft maple which are practically worthless for posts and rarely used for such purposes. The computations show that cottonwood 10 to 40 years old is capable of producing values of \$1.26 to \$5.39 per acre per annum in lumber and fuel, reckoning interest at 4 per cent per annum. A single row one mile long of cottonwood trees oriented north and south and 40 years old was worth \$3,270. Another row of the same age oriented east and west was worth \$2,296 per mile. The values of the north-south rows is strikingly greater than those of the east-west rows, but when reduced to acreage values the difference disappears, because the north-south rows damage much wider strips of land than the east-west rows. The measurements show that cottonwood begins to mature into saw-log size at a very early date, one plantation having produced 4,300 board feet per acre when twenty years old.

THE GROWTH AND YIELD

Equally interesting facts are brought out with reference to the growth and yield of green ash, silver maple, honey locust, white willow, Russian mulberry, and Osage orange. The great value of Osage orange and mulberry in hedges is realized when we learn from this bulletin that four different hedges of the former species ranging from 20 to 31 years old were each worth over \$1,000 per mile, and that two mulberry hedges 11 and 12 years old respectively were each also worth more than \$1,000 per mile. The annual acreage values of the Osage orange plantations ranged from \$1.18 to \$12.51, while one mulberry plantation earned as much as \$32.75 per acre per annum, allowing interest at 4 per cent.

Catalpa is not suitable for windbreak plantations because of its susceptibility to damage from wind and drouth. White pine and Scotch pine are very promising trees for windbreaks in the Lake States and the Middle West.

The last ten pages of the bulletin are devoted to a discussion of methods and plans for the establishment and management of efficient windbreaks. The protection afforded by an Osage orange hedge on the average is equivalent to the yield of a strip twice as wide as the height of the trees, while the protection afforded by the most efficient grove is equivalent to the yield of a strip three times as wide as the height of the trees. "This means that the farmer in the Middle West can afford to maintain a windbreak running through the farm from east to west, and having a width of 240 feet in the case of mature cottonwoods 80 feet high," (page 90). Such a grove will occupy approximately 15 acres on a quarter section; but two such belts of timber are required for the efficient protection of 160 acres. Such windbreaks will pay a rental in protection equivalent to the grain that would grow on the land

they occupy. The timber that they will produce will be clear profit to the land owner.

The author figures that the protective value of a good cottonwood wind-break a mile long at the end of 40 years, computing compound interest, amounts to the enormous sum of \$35,585.50. Reckoning the cost of an acre of this grove also at compound interest, he finds it to be \$2,186.01, so that the area of the grove that will pay its way from the beginning is $\frac{35585.50}{2186.01}$ to 16.28 acres, which is equivalent to a belt 134 feet wide.

In conclusion, the author submits an ideal plan for the protection of a farm in the Middle West. It differs from other plans previously recommended by the Forest Service chiefly in orientation of practically all the plantations in an east-west direction. Modifications of this plan are suggested to fit the high, dry uplands of the Middle West and the cold northern prairies.

Recommendations for plantings are also given to fit the Lake States, the Eastern States, the Southwestern States, and the fruit growing regions of the Pacific Coast States. All plantations proposed are restricted in area as nearly as possible to such an extent that their protective value will pay for the land they occupy. With such plantations the farmer can grow his timber free of cost. A copy of this bulletin should be in the hands of every farmer inhabiting the treeless sections of our country.

QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

SPOKANE, WASH., Mar. 17, 1912.

Editor American Forestry:

Will you kindly tell me if there are any public forestry schools or any through which a person could work his way in the State of Washington?

VERNE CHURCH.

A forestry course is given at the Washington Agricultural College, at Pullman, Wash., at which I understand there is merely a nominal fee for residents of the state.—*Editor.*

DETROIT, MICH., Mar. 15, 1912.

Editor American Forestry:

I write regarding Florida lands about seven miles west of Lake Worth. How far do the everglades run east of Lake Okeechobee? I have bought some land of the Palm Beach Farm Co. and would thank you for any information regarding same. What about the climate?

H. E. RUPP.

The everglades run 45 to 60 miles east of Lake Okeechobee. We have no information about land companies. The region seven miles west of Lake Worth is moderately healthy, the soil is fertile. This is about on the edge of the everglades.—*Editor.*

POTTSVILLE, PA., Mar. 11, 1912.

Editor American Forestry:

A party in Schuylkill County claims to have a powder which will rid chestnut trees and others of the scale by putting it on the roots. He claims it has been tried with success in Schuylkill County. Is the proposition feasible? It is in the form of a powder.

S. M. ENTERLINE.

A thorough test is the only means of determining the question you ask. I suggest that you send samples to the Pennsylvania Chestnut Blight Commission.—*Editor.*

THE HARVARD FOREST

By THEODORE WOOLSEY, JR.

THAT Harvard University is conducting a logging operation is rather a startling statement; it is true however. Owing to the generosity of Mr. John S. Ames, who graduated from the Harvard Forest School of Harvard University with the class of 1909, the Harvard forest was acquired late in 1907. Mr. James W. Brooks, who owned 1800 acres, coöperated by placing a low valuation upon this land. Contiguous owners, with holdings in the aggregate of between 200 and 300 acres, deeded these additional areas so that today the Harvard Forest comprises more than 2000 acres. It was through the courtesy of Mr. Richard T. Fisher, Chairman of the Division of Forestry, that the writer was enabled to visit this tract on January 21st and 22d in order to study the silvical method of treatment.

According to the Official Register of Harvard University, "the forest lies on hilly country at an elevation varying from 800 to 1400 feet above sea level. It is divided into three distinct blocks of (about) 850, 550, and 600 acres, which are located respectively northeast, northwest, and southwest of the village."*

In the words of the Official Register "the primary object in the possession of this forest as part of the equipment of the Division of Forestry, is its use as a field laboratory for the training of students in practical forestry." This forest is particularly valuable as a training ground for students because of the large and varied growing stock and excellent market for practically all species and all kinds of product; and because of the varied distribution of age classes. This facilitates the practice of intensive forestry. It is within two hours' ride of Cambridge and the offices in the Division of Forestry can therefore direct the administration by weekly visits, when not in residence at Petersham. Mr. Fisher feels that the school tract is the strongest single advantage of a professional school of forestry and the school is conducted at the forest from July 1st to December 1st, and from April 1st to June 10th.

EQUIPMENT AND EDUCATIONAL FACILITIES

The equipment includes buildings with bedrooms and recitation rooms, suitable storage space, "and complete set of logging and woods tools," a team used in logging, portable buildings for wood crew, etc.

Such courses as follow can be conducted during the period of field work: identification of species, soil studies, general silvical studies, including marking, planting, and nursery practice, forest management, surveying, engineering, and "forest operations," which include the details of wood management and mill work.

*Petersham, Mass.

EVEN AGED WHITE PINE, 50 YEARS OLD IN THE HARVARD FOREST.





MATURE HARDWOODS AND WHITE PINE CLEAR
CUT. ADJACENT POLE STANDS THINNED.

Among the more important species found on the tract are white pine, red spruce and hemlock, popple, paper birch and black birch, white oak, red oak, white ash, black cherry, and red maple.

According to most recent estimates which are, however, approximate, there are at least twelve millions board feet on the 2,000 acres; nine-tenths of this is white pine. The chief woods as regards yield are, besides white pine, chestnut, red maple, red oak, paper birch, white ash and some scattering black cherry which is surprisingly straight and clean boled. The forest is not a woodlot, but a tract producing chiefly saw timber, nine-tenths of which is worth \$7.50 to \$8.00 on the stump; marketing of this timber presents many interesting problems.

The white pine is worth \$7.50 to \$8.00 on the stump, the hardwoods merchantable for saw timber perhaps \$4.00 and the cordwood from saplings too small to be sawn into lumber or from tops sells for 50 cents a cord standing.

There is an excellent market for all species except popple and red maple lumber. There is a considerable quantity of red maple on the tract which is considered more or less of a weed tree since ordinarily it can only be sold for cordwood. The demand for cordwood, however, exceeds the supply that at present can be cut, and no difficulty has been found in disposing of the white pine for boxes, boards, match sash and blind stock, and "square edge." The box and match stock sells for from \$16 to \$18, one inch square edge for \$20, sash and blind stock for from \$25 to \$35. The chestnut sells as inch sidings for \$17, and as 1½ inch round edge for \$20. Selected ash, red oak, and cherry sells in small quantities at fancy prices.

THE METHOD OF SALE

It is rather surprising that Mr. Fisher has found it more profitable to do his own logging rather than to have it done by contract. The only material sold on the stump is a small quantity of cordwood taken out in cleanings. This is sold to local residents in what might be termed "neighborhood sales." In all operations trees are designated for cutting by marking although they are not stamped with any symbol to show whether they were officially marked or not. This is not considered necessary because the officers in charge are so familiar with each tract that they can distinguish if the original marking has been materially departed from. The pine brush is burned at a cost of 15 to 25 cents per thousand. The hardwood brush is usually burned, particularly when it is cut with the pine, but occasionally it is left in small piles where the fire danger is not considered great. Sales are made informally and no formal contract is required.

The results of logging during the fiscal year of 1911 give the following average cost: Sawing, \$1.00 per M.; drawing in and piling, \$1.75, from the piles to rollway at portable mill 20 cents; sawing at mill by contract, \$2.35; "sticking" 75 cents; hauling to the market, \$2.25 (hardwoods hauling to market, \$4.50). Since the thinnings are taken in connection with the final cuttings, no separate figures on the cost of logging have been secured. As an

estimate, however, it is probably true that thinnings cost \$1.15 to fell and saw, while the final cuttings cost but 55 cents. The average sale price for white pine for 1911 was \$17.50. The total cost of delivery, according to the figures secured, amounted to \$8.30. In other words, there was a net profit of \$9.20 per M. feet for white pine. The cordwood sales of white pine tops probably just about balance the cost of cutting and stacking. Even on the poorer quality hardwoods, taking the total cost of delivery to be in the neighborhood of \$10.20, there would still be a net profit of \$3.30 and on the better quality hardwoods from \$9 to \$15 and up according to quality and species.

THE MANAGEMENT OF THE FOREST

Before the Harvard Corporation would agree to the purchase of this tract they wanted definite assurance that it would not be a source of expense to the university. In other words, Mr. Fisher agreed that it would be self-sustaining. The object of the management, therefore, has been (1) to secure a reasonable return, (2) to cut first the timber that was mature and secure immediate regeneration and to make intermediate cuttings to improve the growing stock.

There is at present no working plan, but it is expected that by 1914 a complete working plan will be drawn up. This lapse of seven years between the purchase of the tract and the completion of a formal working plan is accounted for by the fact that only student labor is used in the collection of data and it was desired to be very certain of local conditions and requirements before the management was committed to a definite line of action. At present the tract is mapped for topography, types and a portion for age classes. There is a rough growth table, volume table for white pine based on the mill run and more or less complete volume tables for chestnut and red maple are now being compiled. Tentatively, it is desired to manage the white pine and hardwoods on a rotation of about 60 years, but blocks of rapidly growing pine will be reserved. The actual cut at present has been fixed roughly at 250,000 feet of saw timber (chiefly pine) and 250 cords of wood. The data already collected for the complete working plan indicate that this cut may be greatly increased—possibly even doubled—with absolute safety.

Since there is considerable land either entirely bare or only covered with a scattered growth of gray birch, forestation has been started. About fifteen acres of white pine, two year old seedlings on the better sites and three year old transplants on the unfavorable sites, all spaced 6x6, have been put in.

During 1911 a good many of the white pine seedlings died during the drought and it was definitely determined that in similar exceptional seasons on the less favorable locations only transplants would succeed when planted in the open. Root competition from low brush did surprisingly little damage; in fact, the young trees succeeded better under huckleberry and other bushes than on bare ground. In the large openings the plantations will undoubtedly be successful, but in the small openings with a diameter of 50 to 100 feet,



THIRTY-YEAR-OLD WHITE PINE AND BIRCH BEFORE CLEARING.



WHITE PINE AND BIRCH AFTER CLEARING.

it is probable that the surrounding white pine wolf trees will suppress and damage a large proportion of the plantations.

In addition, there is a small area of Scotch pine spaced 6x6. It is planned to try out red pine, red oak, and Douglas fir. Were it not for the excellent reproduction of white ash and black cherry, it is probable that blanks would be planted to these valuable species.

A number of experimental sample plots have been established to secure definite data on the different methods of treatment. For example, where the shelterwood system was tried in almost pure white pine, a quarter acre plot was not cut and nearby a quarter acre was measured to show the results of cutting both as to growth and reproduction.

The value of the Harvard forest as a demonstration of what can be done in practical forestry cannot be over-estimated and private owners would profit by visiting this tract in order to make a careful study of the different cuttings and the results. Within twenty or thirty years, when the results can be more accurately gauged, a tract such as this showing varying conditions, will undoubtedly do a great deal to encourage private owners to cut conservatively.

PROTECTION OF THE TRACT

There is little likelihood of trespass and the tract is so situated that the slightest smoke is at once seen and reported to the officer in charge. Since prompt action can be taken when fires start, no attempts have been made to establish costly fire lines and there is little danger of a crown fire except under most extraordinary conditions and then only in your coniferous growth.

There are ducks, deer, foxes, rabbits and partridges on the tract and the management allows hunting by local residents in order to promote good feeling; the damage by deer, particularly to ash seedlings, is quite noticeable and probably hunting will therefore be encouraged.

At present the 250,000 bd. ft. cut annually, is sold to net well over \$17.50 per thousand, or \$1,875, and the hardwood and pine cordwood for \$300 additional, making roughly a net return of \$2,175. While this land will probably not be taxed since it is part of the equipment for teaching forestry, yet the tract is assessed at \$60,000. The present yield, therefore, amounts to about 3.6 per cent on this low valuation; the tract could be sold for \$80,000 quite readily. Yet it must be borne in mind that the cutting is nowhere near the normal yield. For example, suppose 1,800 acres of the 2,000 were producing to their full capacity on a 60 year rotation. This would mean an annual cut of 30 acres, which surely should yield at least 30,000 feet per acre. If this netted only \$10 per thousand, and it will certainly net more than this, perhaps double, by the time the forest is at its full producing capacity, you would have a net annual revenue of from \$9,000 to \$18,000.

It would be interesting to see the effect of somewhat heavier thinnings in the pure pine 35 to 40 years old, perhaps removing one or two thousand feet per acre additional, or fifteen per cent of the present stand as against

ten or twelve per cent. Of course, there is danger in admitting too much light and thus encouraging undergrowth which would hinder reproduction when the seed felling is made. More sample plots will be established (and it is hoped larger ones) since training in experimental work is part of the curriculum of the school. One would expect at least a preliminary working plan, but the drawing up of such a plan has been delayed for entirely practical reasons and it is doubtful if the management has suffered. Perhaps some of the openings have been too large, but it must be remembered that a large opening possesses a distinct value from an experimental standpoint which more than offsets the small loss through lack of pine reproduction which may result. Whether it would be better to adopt an eighty or hundred year rotation for the pine can only be determined when more complete yield-tables are available.

The popularity of the pheasant, as a game bird and as a valuable assistant to the farmer in keeping down insect pests, is manifested in the state-wide demand for eggs and birds which the New York Conservation Department is sending out from the state game farms. Despite the fact that the department will more than double the number of pheasants and eggs distributed last year, the supply for the present season will not be sufficient to meet the demands.

According to the reports received at the Ogden district office of the Forest Service from various supervisors of the National Forests there will be a shortage of water for irrigation purposes in Utah, Nevada and southern Idaho this summer as a result of a light snowfall in the mountains. In a number of localities, according to the report, the fall of snow has been less than half the normal, as indicated by years past.

By the recent affiliation of the Big Blackfoot Milling Company with the Northern Montana Forestry Association, more than 100,000 acres of timber land owned by the Big Blackfoot within the cooperative territory of the Association has been added, and the Flathead National Forest is preparing to join the Association in the near future.

More than 600,000 feet of timber was cut on the Deer Lodge forest reserve last month, which is much more than the normal production for this time of the year. Most of the timber is from the French gulch district and the indications are that the output of timber in this district for the coming year will be the largest since the inauguration of the conservation project in the several counties that are included in the Deer Lodge reserve.

SOUTHERN FORESTRY CONFERENCE

CHIEF FORESTER HENRY S. GRAVES, of the Forest Service, has issued the following statement:

"In connection with the Nashville meeting of the Southern Commercial Congress, April 8 to 10, there will be held a forestry conference. The object of this conference will be to bring together lumbermen, timberland owners, State officials, representatives of civic and other organizations, and influential men who have an interest in the forest problems of the South, in an attempt to work out a constructive program of action.

"I have promised to preside over this conference, in the belief that it will accomplish important results. The Forest Service has, as a result of recent studies, some important facts concerning particularly the forest fire problem, which will be presented at the meetings. I do not believe that either lumbermen or the public have any idea of the seriousness of the damage now done by fire in the South. In justice both to timberland owners and to the public there is urgent need for better protection of the forests of the South, which form so important a part of its resources.

"I believe that the subject is one which calls emphatically for State legislation. Fairness to all calls for an approach to uniform legislation, at least along some lines. There is, in my judgment, great need for those most nearly concerned to meet together and deal with the problems involved constructively.

"I have invited a number of representative lumbermen, State forestry officials, legislators and others to attend and take part in the conference. May I ask you to make public the fact that the conference is open to all, and that I desire to extend, through your columns, a general invitation to all lumbermen and timberland owners to attend? Measures fair to all the interests involved can be shaped up only if all points of view are fully considered, and progress toward better conditions depends upon the formulation of a program on which all can unite.

"The conference will consist of two sessions. The first will be held on the afternoon of April 8. At this session there will be a discussion of losses suffered in the South through forest fires, the possibility of control, what the timberland owner and lumberman can and should do to prevent fire losses, and how far conservative cutting will be practicable if protection from fire is assured.

"The second session of the conference will be held on the morning of April 9 and will discuss State forestry laws, fire organization, need of uniform legislation, and the coöperation of States and private owners with the Federal Government under the Weeks law."

DYNAMITING STUMPS AND TREE HOLES

THE problem of stump removal is an ever recurrent one when farmers are developing new territory or are endeavoring to utilize the entire acreage of their farms. The richness of the forest soil is a constant incentive to clear the land and make it available for cultivation, but the question is, what is the best and cheapest way to remove the stumps? The principal methods now in use are pulling with stumping machines, burning out and blasting out with dynamite.

The stump puller has its advocates who prefer it over either method and others who do not consider it economical. Apparently it is entirely a question of condition. Those who have carefully investigated the subject seem to be of the opinion that where a large number of small stumps are to be removed it pays to invest in a stump puller, provided, however, that only the cost of removing the stumps is to be considered.

The various schemes for burning out stumps are all open to one great objection, that is that the burning of a stump does not remove or even loosen up any of the roots, but it does destroy the humus in the soil, and causes barren spots for a year or so after the stump is burned out.

EFFECT OF DYNAMITING

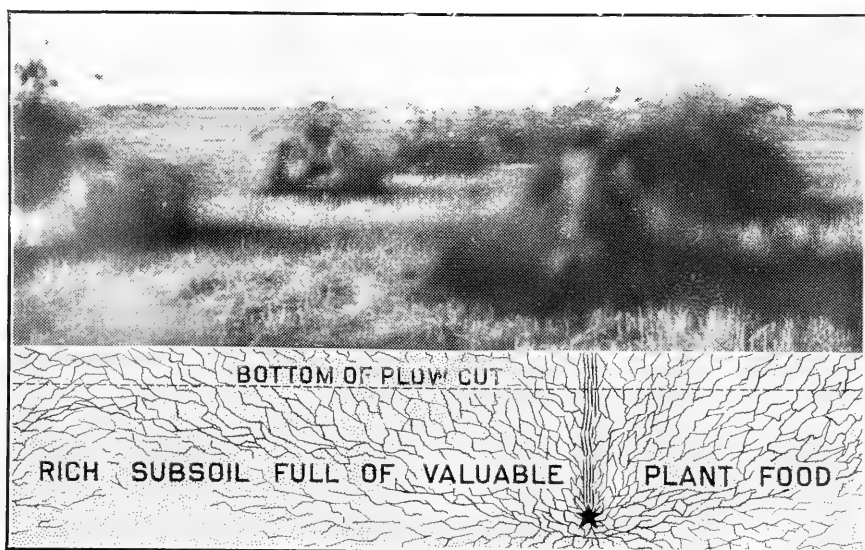
Recent investigations of the use of dynamite for stump removal show that this is fully as economical as any other method with the possible exception of very small stumps, and for large stumps the advantages in its use are very great. In the western or coast states where large trees are the rule, dynamite is commonly employed for this purpose and practically every farmer or farmer's boy is a practical blaster. They handle this high explosive without accident because they have found it no more dangerous than the ordinary shotgun or gasoline. It is simply one of those things that has to be handled with horse sense and ordinary care.

The process is very simple. A hole is bored underneath the stump with a large dirt auger; the hole being usually at an angle of 45 degrees to the ground. A dynamite cartridge is primed with a fulminate cap which has been crimped on to the end of a fuse and the cartridge is then shoved down to the bottom of the hole and tamped in with some damp earth. A match is applied to the fuse which is long enough to give the farmer plenty of time to get away for 150 feet or so, and shortly after there is a boom and the stump is blown clear of the earth and shattered into firewood.

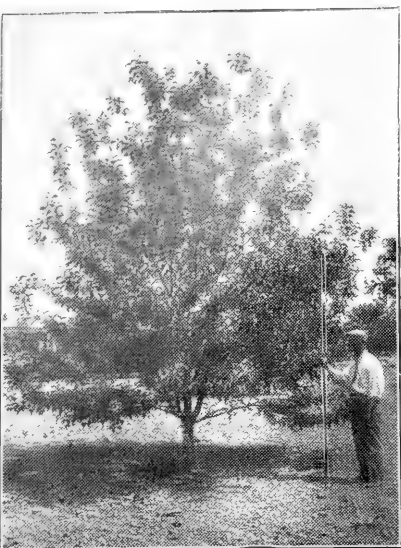
Investigation of the hole shows the roots torn loose from the earth for a radius of about two yards from the stump, and nearly all the dirt that adjoined the stump roots has fallen back into the hole after the blast. The stump parts themselves are found free from dirt as the blast clears them off



SUBSOIL BLASTS FIRED ELECTRICALLY.



ELECTRIC FIRING OF DYNAMITE SHOWING EFFECT ON SOIL.
ERUPTIONS SHOWN ARE MOSTLY GAS.



SIX-YEAR-OLD APPLE TREE PLANTED
IN DYNAMITED HOLE.



SIX-YEAR-OLD APPLE TREE PLANTED
IN SPADED HOLE.



BING CHERRY TREE, TWO YEARS OLD,
SET IN DYNAMITED HOLE.



BING CHERRY TREE, TWO
YEARS OLD, SET IN
SPADED HOLE.

completely. The roots are left in such shape that a few blows with an axe will free every one of them, so that a plow can be run over the old location of the stump in almost every case without any difficulty whatever.

BREAKING UP THE SUBSOIL

But one point which is considered as most important of all in regard to the use of dynamite in stump blasting, is that the same charge which blows out the stump breaks up the subsoil. It has been found by actual experience that wherever stumps have been blown out the soil produces extra vigorous crops. On a farm in California where oats were planted on a field that had been cleared of stumps, the oats grew a foot higher over the spots from which stumps had been blown. Mr. Jas. Craig, proprietor of the Rose Cliff Fruit Farm, Waynesboro, Va., states that in his experience the value of the subsoiling effect of dynamite in stump blasting equals at least 30 per cent of the cost of the dynamite.

These figures seem really conservative in view of results he has obtained from tree planting with dynamite, by means of which apple trees planted six years ago with dynamite are twice as tall as those planted with a spade in the same lot and are so much better branched that they have about three times the bearing capacity and the fruit produced is larger and of better color. Inasmuch as the same soil condition is produced by blasting out a stump it would seem that his estimate of the value of subsoiling incidental to the stump blasting is conservative.

DYNAMITING HOLES FOR TREES

Results which prove conclusively that dynamite has advantages in fruit culture have been secured, but just how great these advantages are cannot be stated until further experiments have demonstrated the most economical methods of using dynamite in the orchard.

It is obvious that several years are required after the planting of a fruit tree in a dynamited hole, to ascertain just how its life or growth differs from one planted in a spaded hole, and further experimentation will be necessary to show whether it is necessary or advisable to use more or less dynamite per hole to get maximum results, cost considered.

The following results already determined should be of interest to progressive horticulturists everywhere:

First.—Planting trees with dynamite practically eliminates the loss of young trees during the first year.

Second.—Trees can be planted much more rapidly by the dynamite method than by the old method.

Third.—Trees planted with dynamite come into bearing from one to two years sooner than those planted by the soil method.

Fourth.—Trees planted by dynamite grow much more rapidly and yield much more heavily than those planted in the old way.

One of the chief elements of loss in orchard work is the loss of trees the first year. S. H. Bollinger, President Clear Creek Lumber Company, Shreveport, La., stated that he used dynamite in blasting the holes in which 1,080 pecan trees were planted one year ago, also for planting 8,000 peach trees. He says the percentage of loss on the pecan trees (which are among the most difficult to set so they will live), was almost nothing compared with the loss on other trees planted in the ordinary way.

Another point of great importance to orchardists is that trees planted with dynamite come into bearing much sooner than when planted by the old way. W. W. Stevens, Orchardist of Mayfield, Ga., reports that he has been using dynamite for tree planting for eighteen or twenty years and that in the planting of peach trees by this method he gained two years in six as compared with the old method. In other words, he got as much fruit from a tree planted with dynamite at four years of age as he got at six years by the old method.

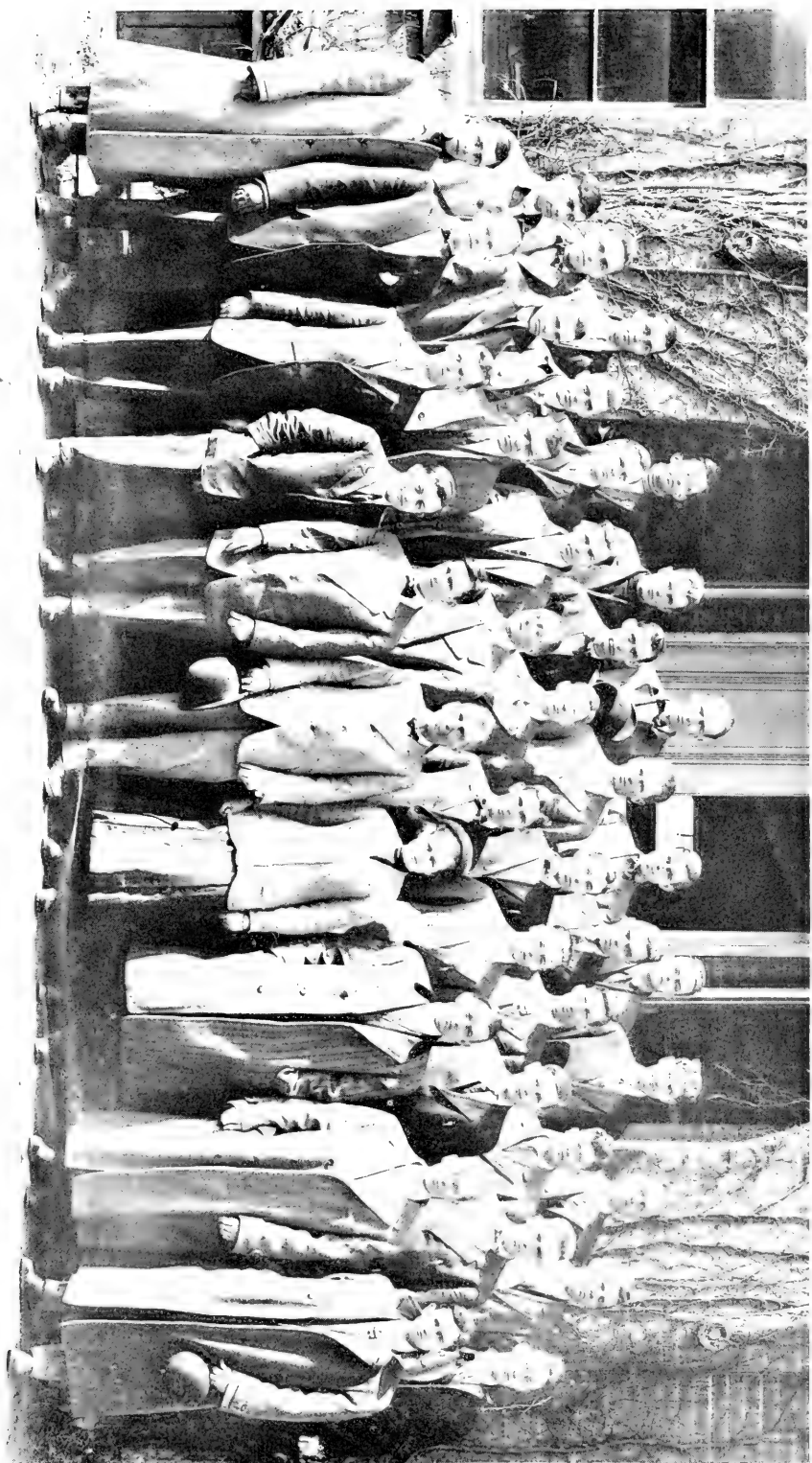
Mrs. John Rawley, of Grante Pass, Oregon, reports that she plants all her trees with dynamite, as a result of careful tests, to show the benefits of this method. She advised that all trees be set in wet weather, as this insures a storage of moisture under the tree. This is the chief reason why planting trees with dynamite is beneficial.

Trees planted in spaded holes must fight their way into the compact subsoil which has never been disturbed, whereas when planted in a dynamited hole the ground being thoroughly broken up under the surface soil makes an easy path for the roots so that they spread out and have a large area from which to draw water and plant food.

A little thought will show the reason why dynamiting is so beneficial in tree planting. The principal plant food is water and fertile elements of the soil must be absorbed in water before they can be absorbed by the terminal roots. Hence the larger the area throughout which these terminal roots are spread, the greater the amount of moisture the tree can draw on and the greater the amount of water and plant food it can obtain.

This also explains the reason why dynamiting the soil between rows of old or failing fruit trees renews their vigor, because most of the water is taken up by the terminal roots which run out many feet from the trunk and the blasting creates water reservoirs in the soil between the rows.

The Amount of damage done by forest fires in Michigan in 1911 is estimated by W. R. Oates, State Game, Fish and Forestry Warden, in a report just made public, at \$3,567,483.68. Far the greatest part of the loss occurred in lower Michigan counties, as conditions in the upper peninsula last summer were not favorable to forest fires, and this region escaped with a light toll of damage.



THE OHIO STATE UNIVERSITY FORESTRY CLUB. NOTICE MISS MARIE D'UN, THE ONLY GIRL FORESTRY STUDENT IN THE UNITED STATES.



OHIO STATE UNIVERSITY CAMPUS NEAR FORESTRY
BUILDING.

FORESTRY AT THE OHIO STATE UNIVERSITY

By PROF. C. H. GOETZ

OHIO was one of the first States that lead in the movement for the conservation of our forest resources. As far back as 1855 some of her leading citizens like Dr. John A. Warder, E. E. Barney and others were known nationally as promoters of forestry.

Since that time Ohio has been one of the leaders in State forestry work. While up to 1909 she has failed to establish a chair of forestry at her University and Agricultural college, yet for many years forestry instruction had been given in connection with horticulture.

The Ohio State University is situated at Columbus, Ohio, about the center of the State. The University is well equipped for giving the student, thorough training along all lines of work, because the Agricultural college is at the same place and under the same management, so that the university student can get the benefit of the agricultural college work and the Agricultural college student the work of the university, making of all well-trained and rounded out students.

In this way the forestry student is able to get a solid, sure substantial foundation for all his subsequent technical and practical work.

The faculty of the forestry department consists of a professor in charge and two assistants to take care of the technical subjects and a large corps of professors of the university and agricultural departments to give the scientific and special work of the auxiliary studies.

The forestry course as given in four years, and as placed into the curriculum of the University a few years back consists of all the elementary basal subjects preparatory to forestry and includes all the subjects of technical and practical forestry as taught in all of the most prominent forestry schools, like Michigan and Yale.

The whole four years' course is designed to give the student all the necessary forestry education and yet to leave room for other auxiliary studies, so as to make the forestry student an all-round well-fitted-out man, capable to cope with any situation that he may meet when going out into the field of work.

The work in the courses has been combined into as few courses as possible, rather than to spread it out in a spread eagle fashion so as to make it look large or extended, and to have it overlap.

To give to the student as much as possible all the practical work, that can be given at a school has been the aim in the making of the course of studies. For this purpose there has been established a good-sized nursery, in connection with the virgin stand of timber still standing on the University

grounds. The success of school forestry completely alone those of the first few years has in it both the individual interest and the social study along economic and technical lines.

During the summer months employment is sought for the students in the U. S. national forests, the State forests and the timber lands of the country.

While the forestry course is given here, great emphasis is given especially to the thorough training in forestry along all technical lines. Yet additionally it also provides a good foundation for other studies such as civil engineering, mechanical engineering, horticulture, chemistry, geology, zoology, geology and physics, so that with very little extra work a forestry student may fit himself for any other field in life.

That the forestry school is successful is evidenced by the fact that some of her graduates are holding State Forestry positions, and others are in private and U. S. Forest Service work.

VERMONT'S MEETING

At the business meeting of the Vermont State Forestry Association convened at the Hotel Vermont was called to order by President W. H. the assembly opened by the playing of the Vermont State Anthem. Mr. Fletcher has long been an active supporter of the forestry movement in the State and expressed himself as a firm believer in the policy of the State investing a certain amount of money each year in the purchase of State forests. The other officers elected were: Vice-Presidents, Hon. Charles Dwyer, Sharon, and Hon. W. S. Van Rensselaer, Burlington; Secretary, Mr. George H. Burt, of Stowe. The Executive Committee consisted of: E. C. Fernald, of Barre; J. H. Carpenter, Mr. Charles Greene, of White River Junction; General Thos. C. Foss, of Bennington; and J. Marion Plummer, of and J. Hayes, Burlington.

At the meeting was a report on the Vermont Forestry Association. The President, Mr. W. H. Fletcher, presented an instructive address on "The Education of State Foresters." Mr. George Hubert, Superintendent of the International Paper Company, told of the extensive forestry work now being carried on at the company in Vermont and New Hampshire. He told of the nursery in Barre, of where a large supply of seedlings is being raised for planting on the company lands, and of the improved method of logging following the harvesting work. Mr. Fernald of the State Forest Service in Vermont. Mr. Hayes, State Forester, discussed the question of forest taxation and suggested a bill along the line of the one advised by the Forestry Commission and the State Forestry Commission. This bill would tax burned and cut or cleared \$3.00 per acre and make a tax per acre on the increase of all stumpage value.

The association adjourned after a review of the proceedings for 1911. It proposes hereafter to hold in addition to the annual meeting a summer field meeting in some forest which is being managed in forestry methods. A good many new members have recently joined the Association and its prospects for future work are very bright.



1. Large tree trunk in foreground, looking down a path in a forest. (1911)



DOCTORING UP A SYCAMORE GIANT WITH CONCRETE AND CEMENT.



THE JOB WAS DONE WITH THREE WAGON LOADS OF CONCRETE AND CEMENT TO FILL THE HOLLOW.

LODGE OF O. M. BILLINKZ AT TENDERFOOT LAKE, WISCONSIN.

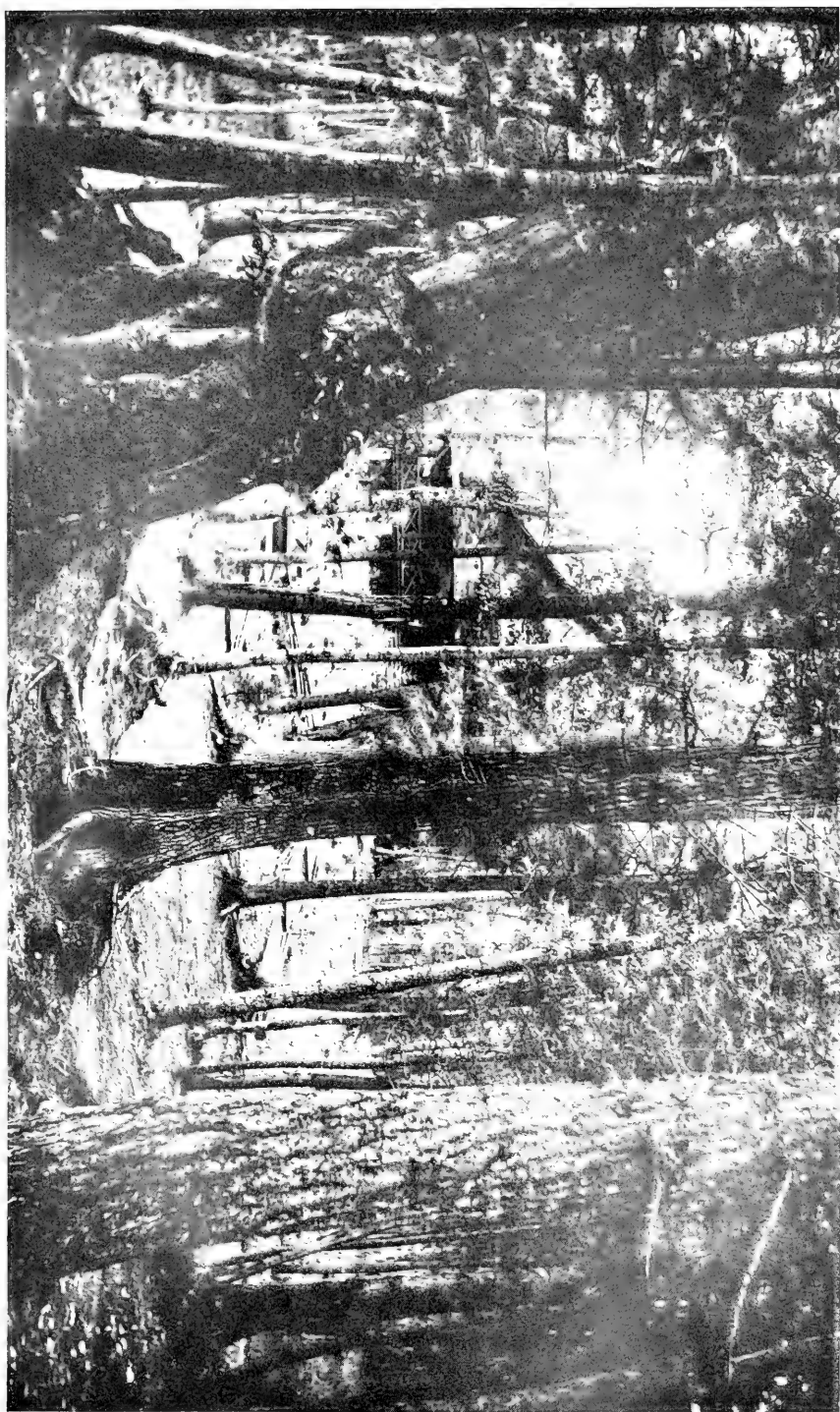




Photo by Dr. Hugh P. Baker.

FIELD FORCE OF PENNSYLVANIA CHESTNUT BLIGHT COMMISSION AT A SHORT COURSE,
PENNSYLVANIA COLLEGE.

BLIGHT COMMISSION INSTRUCTION

By PROF. HUGH P. BAKER

DURING the week of February 26th to March 2d, Mr. S. B. Detwiler, Executive Officer of the Pennsylvania Chestnut Tree Blight Commission, his field superintendents and twenty-four of the field agents gathered in the Forestry Building at Penn State for lectures and demonstrations in Forest Pathology, Soils, Entomology and Forestry.

Professor H. R. Fulton, Pathologist of the Experiment Station, told the men of the nature of fungi and their relation to other plants. How natural conditions may aid or check the extension of a fungus and of the common methods of combatting fungi. An especial study was made of the Chestnut Blight Disease (*Diaporthe parasitica* Murrill) and the men were shown the different spore forms and their development both in the field and under the microscope.

In the work in Entomology, Professor W. R. McConnell described the development of an insect and showed how they may be instrumental in spreading the spores of fungi. The importance of bird life in checking extension of insects was explained and beneficial birds were shown and described. The men were unusually well acquainted with the common birds.

Professor C. F. Shaw, who is carrying on a soil survey of the State, told of the origin and nature of the various soils of Pennsylvania and touched upon the influence of soils upon tree growth. The importance of protecting the soil from erosion and baking, was brought out. Practical suggestions were given for preventing the washing of soils from steep slopes.

A forenoon was spent with Professor J. W. Gregg, Landscape Gardener, who gave a demonstration in pruning trees of different sizes and how wounds should be treated to prevent the entrance of spores of fungi. The men are being asked constantly as to methods of pruning trees infested with insects and disease and told of hearing many queer theories as to pruning.

The members of the Department of Forestry gave work both in the class room and in the field in rough methods of measuring and estimating timber; the structure and market forms of timber and ways of increasing durability. Some simple methods of management were discussed and applied to woodlands in which chestnut was dying out. The best trees for planting in various situations were described and estimates of cost of planting and returns were given.

The field force of the Commission is made up of an attractive and enthusiastic lot of fellows of all ages from recent high school and college graduates to self trained men past middle age who have had long experience in the woods.

During the past winter, while it has been difficult to work in the woods, the Commission has been doing a splendid line of educational work throughout the State. Meetings and demonstrations have been held in school houses, grange halls and city buildings throughout the eastern and central portions of the state. The people are showing a surprising interest in the work of the Commission and in forestry and whatever the results of the efforts to check the blight may be there is no question but that the work of the Commission will have a tremendous influence in developing Forestry in Pennsylvania.

LUMBERMEN AND FORESTRY

THE REPORT OF THE FORESTRY COMMITTEE AT THE NATIONAL WHOLESALE LUMBER DEALERS' ASSOCIATION MEETING IN LOUISVILLE, MARCH 6 AND 7

READ BY W. C. SYKES.

THE year has been one full of interest with conservation still the keynote of all discussions, lectures, or proposed legislation with reference to forestry. The term conservation in its true sense, i. e., to use wisely and not tie up what we already possess, is being better understood and all are working toward this end in so far as conservation does not conflict with commerce and increase cost of production. Conservation methods in the larger sense are something which cover perhaps a period of time much longer than the life cycle of a human being and for this reason they must often be taken up by the Government either Federal or State or both. Right in this connection we wish to call your attention to some proposed legislation in the Empire State.

The proposed legislation in New York is probably the most drastic of any law that has yet been suggested. Although the proposed law will effect directly but a part of the State of New York should it become a law, it is of great significance to all lumbermen, for if it passes it will establish a principle which might affect the lumber and timber interests all over our country. This principle is that a state may control and regulate the cutting of all timber on private lands and prohibit the cutting by a diameter limit without compensation to the owner of the land for the timber which he may not cut. This, it is maintained, can be done under the police power of the state.

THE PROPOSED LAW

The proposed New York law reads thus: "To the end that the water supply of the state may be conserved, the forests protected, and the public interests safeguarded, it is herein provided:

"That no soft wood timber, less than eight inches in diameter, breast high, growing upon any wild, forest lands within the towns specified in section ninety-seven of this chapter shall be cut without the written consent of the Conservation Commission, first obtained."

Right here I might say the towns referred to include the Adirondack Mountains, the Catskills, and some land beside these sections being the timber sections of the state, "which consent shall be evidenced by a resolution duly adopted by said Commission, and entered at length in its book of minutes; and such Commission may *make rules* and regulations to control the cutting and removal both of the timber and trees prohibited, and the timber and trees permitted, to be cut under this section."

Another section of the proposed law provides:

"That the Conservation Commission may require land owners to dispose of their slashings as the Commission 'may direct.'"

If this is not done after it has been ordered the Commission may have the work done, and the expense "shall be a lien upon the land on which they are situated, enforceable as liens for the improvement of real estate are enforced."

THE LUMBERMEN'S ATTITUDE

Were such legislation as this to pass the results might be extremely burdensome to the lumberman. These sections put so much power in the hands of the state and leave so little to the individuals and corporations owning timber land that it seems under some circumstances the state would be directing and managing the entire woodlands department of a business, and this would be possible in every case if the state cared to exercise its rights. Lumber and pulp interests have opposed this legislation on the ground that it is unconstitutional since it takes away property without due process of law. A recent decision of the Supreme Court of Wisconsin upholds this position.

Right along this line it is interesting to find that lumbermen, not knowing about these proposed New York State measures, suggest as a good method of conserving the forests that laws should be made regulating the cutting of timber by lumbermen, because the lumbermen are in the best position to bring about practical reforestation. The objectionable features are, however, to be eliminated by special tax so that the lumberman can carry his lands and not be at serious expense, and a bonus is to be paid lumbermen producing timber up to a certain size.

REFORESTATION APPROVED

Your Committee is in hearty accord with any regulations which will bring about reforestation: We believe in state regulation of cutting where it does not take away any element of value or take the control of directing the policies of the woods department out of the hands of the lumbermen. We believe that men who have spent their lives in the woods studying methods of operation are better equipped to handle this than are the Government officials no matter how well they may be trained. We do approve of coöperation between operators and State and Federal officials so that best methods may be adopted, but believe a property owner should be entitled to look after his own property. The subject of state control of private cutting is a large one and will no doubt come up again. In this limited space we cannot deal with it further.

Canada, in dealing with her lumbermen, is very different from the United States. Her policy is to keep the forest land intact with the exception of burned-over lands. The timber on these burned lands is sold to operators,

but the cutting is restricted to twelve inches on the stump in the case of green timber. This practice has been in vogue since nineteen hundred and two. Most of the operators in Canada own their own timber lands under a lease, but are not restricted in cutting, except what has been sold since 1902, as described above. Dr. Diver, of your Committee, believes this restrictive policy to be wrong, as timber land which is burned has all of the trees burned, as a rule, so this twelve inch restriction does practically no good. He also reports that in Northern Canada the cut-over lands are being retimbered by a young growth of pine which has sprung up of itself. This would go to show that natural reforestation brings good results; it is undoubtedly cheaper.

FOREST FIRE PROTECTION

The greatest enemy of the forest is fire. If we can overcome fire hazard, we can let the forest do its own planting with good results. This statement is only general, for there are places devoid of seed trees where planting must be done. We are all familiar with the causes of forest fires, and the preventive measures—such as roads, fire lines, telephones, look-out stations, regulations as to campers, fire patrol, etc.—but, unfortunately, because of the inevitable slash which must follow a cutting, the lumbermen have been held responsible for some fires, even though these precautions are taken.

If we can eliminate the slash, we get rid of one of our greatest menaces. Can this be done at a profit, or without incurring loss? Obviously this is impossible with all the finer twigs and limbs; but in the case of the larger limbs and branches, butts, etc., it seems this could be done even profitably. Fire wood, chemical wood, pulp wood, and various other uses should consume a lot of the dangerous slash, and what remains would be the material that would rot quickly, so that if fire could be kept out for a few years the danger would be greatly reduced. This is one of our big problems today, and it must be met. Forest products must be had by all, and in order to insure this in the future much of the land must be productive of other timber crops. Planting from the seed or seedling is slow and costly, and on land which has been burned over the soil is often burned also, so that there is very little chance for any new growth. This all leads back to our first proposition that fire must be kept out and then natural reforestation can be looked for, and the saplings and young trees which today are regarded as of little value will have an opportunity to mature.

Why plant seeds when we already have trees half or two-thirds grown which, if protected, will mature and be of use in much less time than will seedlings and thus do away, to a large degree, with the risk of young trees dying, for their mortality is great as compared with older trees. We, therefore, would recommend that every precaution be used to keep fire out of cut-over timber lands, and also out of slashings, for these slashings and cut-over lands must bear timber again; and we urge the utilization of the woods and debris usually left in slashings.

In some cases, the finer twigs and brush might be burned to good advantage. There is great opportunity and need for new methods along this line, and a greater degree of utilization of the debris of slashings. One measure which would aid greatly in keeping fires in slashings from spreading into green timber is to fell all trees along the line between the land to be cut and the other land, so that they will fall in the land cut, and their tops will not be in the green timber of the land to be left. This would put a fire line around the slash at practically no additional expense to the operator.

CHESTNUT BLIGHT SITUATION

Of late, we have heard much of the chestnut blight. The condition is serious. The blight, or chestnut bark disease was first noticed near New York City in 1904. At the present time it is in Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia. The total loss from the disease is now estimated at \$25,000,000.

The disease is caused by a fungus, and works in the inner bark. It gradually rings the tree and causes its death. This disease is like a germ disease, and it is caused by spores which get at any injury to the bark of a tree and soon infect it. Borers' tunnels are the most common entrance places for spores.

To combat this disease is a problem for the Government and not for the lumbermen. Lumbermen, of course, should cooperate. The bark of infected trees must be destroyed. Infected sections must be isolated, and the bark of trees destroyed, or all our chestnut trees will go. Up to the present time no way of curing an infected tree has been found. Obviously this must be taken up by the various states concerned, and the Federal Government. The United States Department of Agriculture has already put some study on the subject. Pennsylvania has established a "Commission for the investigation and control of chestnut tree blight disease." Twenty-five thousand dollars was made available at once, and \$250,000 more has been appropriated for this work. If the disease cannot be isolated in sections and gradually stamped out, it may be necessary to use up all our chestnut as soon as possible, unless some remedy is found, and then set out trees and start our chestnut forests all over again. We hope the situation will not become so serious as this; but the outlook is not encouraging. The State of New York, in its proposed legislation, authorizes the appointment of a Forest Pathologist.

However, the proposed law gives the Pathologist so much power that he could make trouble and expense for the timber holders by requiring them to cut and remove or destroy infected or diseased trees, no matter how remote they may be located. Pennsylvania already has a State Pathologist and good results are being secured. The chestnut blight is the most serious problem confronting the department at the present time. Tree diseases are serious, especially when they assume the dimensions of the one just considered.

They demand our attention. One simple recommendation which would help in keeping out fire, as well as disease, is the cutting down of rotten or dead stubs. These are very frequently diseased and will infect the neighboring trees, and in case of fire, we find the burning stub is often the one cause which may spread a fire quickly, as the fire runs clear to the top of the stub and then burning pieces of the rotten wood are carried by the wind often comparatively long distances.

THE LUMBERMEN'S POSITION

We have attempted to call attention to some of the present day problems before the timber owner and operator. Our information is localized, but in general might apply to all timber holdings. The present effort to subject the timber owner and lumberman to state control over his cutting, without concession in taxation or compensation for lands and timber tied up, which amounts to confiscation, is probably the most serious step that has yet been attempted. This principle, once established, would be felt by all. If it is good business and economy to leave timber standing, so it may grow larger and bring about natural reforestation, the lumberman will fall in line. If the Government will not trust the lumberman this far, then let the Government buy the land. What is good forestry, we believe is good business and economy. Education is what we need and seek, and not coercive measures.

NORTH CAROLINA FORESTRY ASSOCIATION CONVENTION

BY FORESTER J. S. HOLMES

A DECIDED awakening of public opinion was manifested by the large attendance of interested delegates at the second annual convention of the North Carolina Forestry Association recently held in Raleigh, N. C. This association, which was organized a year ago, with the object of promoting "the protection of the forests of North Carolina from fire and from destructive insects, and promoting their perpetuation by wise use and by the reforestation of cut-over and abandoned lands," has, by the appointment of vice-presidents in every senatorial district of the state, laid a foundation for forestry activity which has already brought far-reaching results.

Governor W. W. Kitchin welcomed the delegates and expressed his deep interest in, and hearty sympathy with the movement. The president, Dr. D. A. Hill, president of the State Agricultural and Mechanical College, in his address advocated a campaign of publicity as a means to secure the election of interested representatives for the next General Assembly. He said every member should make a point of reporting to his local paper each forest fire which occurs in his county, approximating the damage done and calling attention to the fact that such fire could have been avoided had certain pre-

cautions been taken. Public meetings to discuss forestry questions were also advocated.

In the unavoidable absence of Dr. A. D. Hopkins, Mr. E. B. Mason, of the United States Bureau of Entomology, gave an address on the Southern Pine Beetle and Its Control. This question is one of vital interest to the people of the state and already two local associations have been formed to coöperate with the United States Bureau of Entomology in dealing with it.

The paper by Mr. J. G. Peters, Chief of State Coöperation of the United States Forest Service, dealing with coöperative fire protection under the Weeks Law, brought out the value to North Carolina of the offer which the United States Department of Agriculture is making to the various states. Probably a larger number of navigable rivers have their headwaters in western North Carolina than in any other equal area in the United States, and yet the attempt of the Federal Government to assist in protecting such streams cannot be put into force in North Carolina because no appropriation is made by this state for fire protection. A united effort will be made by the Forestry Association to obtain such legislation next year as will allow the state to receive the assistance offered by the United States Department of Agriculture under the Weeks Bill.

The question of state-wide stock law cannot be separated from a discussion of forest protection, and the paper by the Hon. Hugh MacRae, of Wilmington, on The Stock Law and Forest Protection was timely, and elicited a great deal of favorable comment.

The resolutions which were passed embody the sentiments of the Association and pretty well covered the subjects discussed at the two meetings.

In addition to the resolutions, the Association asked for the appointment of a legislative committee, which is to draw up a forestry bill for the consideration of the next legislature. This committee will represent all phases of the forestry movement, and a bill endorsed by it and subsequently by the whole association, should stand a good chance of becoming law.

The officers elected for the ensuing year are: President, Mr. E. B. Wright, president of the Butters Lumber Company of Boardman, N. C., and Secretary-Treasurer, Mr. J. S. Holmes, Forester of the State Geological and Economic Survey, Chapel Hill, N. C.

THE 1911 INDEX

The 1911 index for AMERICAN FORESTRY is now ready and subscribers may have it mailed to them by writing for it.

TWO PRIVATE FOREST ARBORETUMS

AMERICAN FORESTRY readers who have been interested in the proposed forest arboretum at Letchworth Park will undoubtedly be glad to hear of two already existent forest arboretums of the same kind, though not the same extent, the little trees of which are now eight to ten years old, which are parts of private estates in this country. One of them is at Potowomet, Connecticut, on the estate which has been so notably connected with the past history of forestry in this country under the name of the "Russell Estate," and which now belongs to Col. R. H. I. Goddard, to whose progressive interest and enthusiasm the undertaking owes its success. The other is a part of the planting on the estate of Mr. Percy Rockefeller at Greenwich. Both are the work of Mr. Theodore F. Borst, Forest Engineer of the American Forestry Company.

The Russell Estate has for nearly forty years been one of the most successful examples of private forestry in this country, and its various plantings have been partially inspired from the first by the recommendations of Prof. Charles Sprague Sargent of the Arnold Arboretum. When Col. Goddard decided to continue and complete the old plantings, Prof. Sargent recommended that the services of a trained forester be called on to unify the existing stands, and to carry the old planting over into a harmonious relation with the large new stands contemplated. Mr. Borst had for some held the idea that a living tree museum should be established, for an opportunity to study species and habits of forest trees in a planted forest, from the point of view both of utility and beauty. This seemed an excellent opportunity to do so, and the idea appealed to Col. Goddard, who saw in it a fitting continuation of the pioneer work of Mr. Russell. Accordingly, the completion of the reforestation, involving the planting of 200,000 trees the first two years, and another 100,000 this coming year, included the establishment of such a forest arboretum. It was laid out in such a way as to unify the existing blocks, and its object was to develop all the species which would flourish well in that locality. It contains nearly seventy-five distinct species in pure stands and in combinations, and is undoubtedly the first forest arboretum of its kind in America, and probably the first in the world.


All the species, in blocks, are to be labelled by indestructible plates, which Col. Goddard is having made, a feature which will add much to the permanent value and interest.

The planting at Mr. Percy Rockefeller's at Greenwich was a close second in time. Mr. Rockefeller took a great interest in the scientific side of the undertaking, and felt, too, that it would add much to the beauty which was the first aim in the whole design in that instance. His arboretum has in it thirty-nine species.

Both Mr. Goddard and Mr. Rockefeller are exceedingly fond of trees and deeply interested in forestry in its application to private estates. They will be glad to permit any student of forestry to visit these arboretums on application to their superintendents.

TIMBERLAND OWNERS AND FORESTRY

By W. R. BROWN

 HERE has been widespread and general co-operation in New Hampshire between the Federal, State, Association and Industrial interests, and a mutual attempt to find the proper method of forest protection, operation and renewal which would work out for all interests the widest practical and lasting benefit. In this work the timberland owners have done their fair share, and I will explain such methods as are meeting with their hearty support at the present time, and the degree of coöperation in others which I think appears practical to them. As the many associations of timberland owners which have sprung up the past three years, control a considerable share of all the timber, their coöperation should be most urgently desired to obtain immediate results.

Now it is necessarily a practical problem with them, and their first question is inevitably "does it pay"? In other words, while equally interested with all good citizens in the future of the country and subscribing thereto liberally out of taxes, they are chiefly concerned in assisting prosperity by bending their energies to the advance of their particular business, and in securing the proper base for a successful future by seeing that there is no present loss or disaster. The whole problem is, I think, to persuade them, when we have done this honestly for ourselves, of what is best for them in the long run, helping them to maintain and build up their business meanwhile. This is particularly so when we consider the advantage of maintaining a strong international position among other nations, which is largely dependent on the position we take among one another at home.

WHAT TIMBERLAND OWNERS WANT

The following are some of the practical points which appeal to the timberland owner in forestry:

First of all, fire protection, of which they have been woefully lacking in return for taxes paid in the past, and where they can see clearly the benefits of coöperation both among themselves and with the State and Government, and it is along these lines that the first timberland owners' associations have been formed, and the greatest energy is being put forth.

Following this come study of the prevention of waste in the cutting and marketing of timber, the practice of giving closer inspection to logging operation; study of scientific management in the handling of logs; and the encouragement of new wood-working industries for using up more closely the products of their lands. Such work as is being done by the Forest Products Laboratory in Madison, Wisconsin, is of the greatest value.

Another point is the question of taxation, which although not now generally acute, might become so, as the present laws are theoretically unjust, but, due to the good sense and inherent justice of the average tax assessor,

have not been carried out stringently; so that, the solving of this question wisely would meet with their hearty approval.

Another point, of which there is an increasing practice going on among the timberland owners, is the judicious cutting of their trees for the propagating of a future growth, principally among the large owners who have mills to conserve or others who wish a continuous investment and return.

Planting is principally going on among railroad companies for railroad ties and among the farmers whose labor is not a cash charge and by large owners who have both very favorable land conditions for planting and long time investments to secure. It is very doubtful, however, if private owners can afford to plant trees to any extent for some time, unless the markets improve or timber becomes more scarce than at present, which is not imminent in view of the fact that large bodies of uncut timber can be purchased at low prices in Canada, and in the United States, and markets will be steadied by the constantly improving means of communication such as the Panama Canal will furnish.

On the opposite hand, another point which I think is appealing to the far-sighted timberland owners is, the advantage in the Federal and State ownership for the reason that the State can carry on and develop many tracts into a future growth, create future supply, and be a steady influence upon future markets.

In fact, all forestry, if looked at in this light, will be to the timberland owners' future advantage and good, as well as to the good of the country at large. But it is equally true that its growth must be slow and sure and achieved step by step and the present worth of each step must be demonstrated and proved to meet with the timberland owners' hearty support, which I think they are in a frame of mind to more than willingly give.

A FOREST THAT PAYS \$40 AN ACRE YEARLY

By GEORGE W. KEHR

HERE is a tract of timber containing 90 to 100 acres near Port Matilda, Center County, Pa., owned by Christian Sharer, that has not been "hogged" over during the last fifty years. It covers a steep, rocky mountain-side, and consists of chestnut, oaks, white pine, and a few other varieties of hard and soft wood.

During the winter of 1911-12, the ripe timber, on five average acres of this tract was cut—telephone poles, railroad ties, mine props and a little saw stuff. The 700 thirty to fifty foot chestnut poles taken out are worth \$3,000 f. o. b. cars. Cutting and hauling them cost \$350. Fifteen cars of small ties and props are worth \$225 net. We have no figures to show the number of railroad ties and quantity of sawed lumber cut, but there are 200 to 300 ties and several thousand feet of plank.

The chestnut that was cut had reached the "hypermature" stage. Ninety per cent of these trees were dead at the tops. All the other trees cut were either ripe or were crowding and needed to be removed. The stand left is as

perfect as could be wished—trees eight inches in diameter and smaller, properly spaced, and of right mixed kinds.

Fourteen and fifteen years ago every tree of marketable size and kind was cut from this same acreage. That crop of timber was more valuable than the present one. In fifteen years (by 1927) fully as big a crop should be cut as the one of 1912, still leaving the stand of growing timber perfect for the future.

The poles and bi-products of mine ties and props are the crop from the five acres for one fifteen year period, (forgetting the railroad ties and saw stuff). The net cash value of these poles and top-stuff is \$28.75. *It figures \$38.33 for each acre every year.*

Taxes and interest reduce this about 10 per cent—then the timber pays better than wheat, corn, oats, or any rotation of general crops on the best of land. The work required by the timber is less than a quarter of the amount necessary in farming those crops. On rich bottom land the timber growth would be much heavier than on this thin, high, dry soil. Proper planting and thinning of timber trees would increase the growth and the amount of marketable lumber considerably.

This timber area lies on a slope above the Sharer home. It increases the amount of water available all summer long over its own area and over a large area lying below it. Several springs at its lower edge are never failing. The August freshets flowing from its carpeted surface are as pure as June streams. Game in plenty makes its home among the trees, and the forest increases the beauty of the neighborhood.

In the light of these facts it would seem that many acres all over the country that were once cleared and are farmed or are lying idle now, ought to be growing timber—when otherwise waste land in natural timber, with no care beyond intelligent cutting, can yield almost \$40 on an acre yearly, that land certainly should be in timber, and under proper management. Fifteen per cent of every farm in the country should be a permanent forest, no matter how good the soil, while on thousands of farms and on all unproductive land there is no excuse for anything else.

FORESTRY AND THE STATE LEGISLATURE

BY W. B. GREELEY

OF THE FOREST SERVICE

IN the course of my few years' experience, I have seen something of the development of the forestry movement, particularly in the Northwest, and I have become convinced that the critical point in the present stage of this great movement, the point of immediate importance, is the state legislature. It is a common saying, summed up in one of Mr. Pinchot's latest epigrams, that "forestry has succeeded everywhere except in the woods." We know that there are so many reasons for the backwardness of the private owners throughout the country at large in attempting the application of the

forestry principle to their property. We know that some of those reasons are within their control, that many of them are beyond their control, and that many or most of the factors beyond their control are within the control of the state governments and specifically the state legislatures.

I have seen, particularly in a number of western states, many instances of the gropings of men interested in forestry for wise state legislation. I have seen abortive attempts at such legislation. I have seen instances where certain elements in those states have exerted themselves to make the legislation proposed so extreme that it would fail of passage.

I have in mind particularly a law introduced in the legislature of Montana, the last session, which proposed, whenever the responsibility for starting a forest fire was laid at the door of a corporation, the President or Executive officer of that corporation should be subject to imprisonment for a minimum period of six months. It was seriously proposed in that bill to enforce a provision of that character, and it is very obvious that there were interests involved which were working to make the proposed legislation as extreme as possible, so that it would fall of its own weight.

STANDARDIZING LEGISLATION

It has occurred to me, therefore, that one of the most effective things that the American Forestry Association might do would be to standardize wise forest legislation for states, at least the fundamental principles of wise forest legislation, without attempting, of course, to determine how the principles shall be applied under any one of a great variety of conditions.

I think that this is one of the most effective ways in which the members of the American Forestry Association can coöperate with the Forest Service. One of the features of the work of the Forest Service, a feature which is assuming increasing importance, is the critical study of state forest systems and of the legislation necessary to produce an effective state forest system. We can do much in collating, in publishing results of the various laws, and in showing what the different states are attempting to do, and something of the practical results accomplished in the various states. We can do very much in creating a favorable sentiment in the states, particularly in the states that are just now groping after the right kind of forest legislation.

It occurs to me that the American Forestry Association might do a very effective work by working certain standards and principles as to what constitutes the right kind of state forestry, and then using its members as missionaries to make these principles known and to secure their practical adoption and application under various conditions. We cannot attempt to do much at first. We must be willing to accept the half loaf in cases; we must be willing to adapt our ideas to rough and ready conditions.

EDITORIAL

THE Agricultural Bill has just passed the House of Representatives. It contains a reduction of over one million dollars from the present appropriation for the Forest Service, and this cut is made almost wholly from the funds available to prevent and fight forest fires. The current appropriation of \$500,000 for building roads, trails, and telephone lines needed to call and get men quickly to the fires is reduced to \$275,000, and of the emergency fund of \$1,000,000 for fighting forest fires only one-fifth remains. The House, by a vote of seventy-four to seventy, restored the \$225,000 cut from the appropriation for roads, trails, and telephone lines; but on the final reading of the Bill, the amendment for this increase was defeated.

These cuts are made in the face of the record of 1910, in which seventy-nine fire fighters and twenty-five settlers were burned to death in the National Forests, and twelve million dollars' worth of timber was destroyed; and in the face of full knowledge, that as the result of insufficient appropriation, the National Forests, which constitute about two billion dollars' worth of public property, are in grave danger of even greater loss from fire.

The protection of public property and of the lives of settlers, their wives and their children, as well as of the public servants within the National Forests, lies close to the public welfare. It is easy to malign the Forest Service, as certain members of Congress are accustomed to do. But it is much easier to malign the Forest Ranger than it is to do their brave and efficient work on the fire line. We must not let false economy further imperil the safety of public resources and the protection of human lives.

It is time for Congress to face the facts. Before the National forests can be made reasonably safe against fire, they must have ten times the present trails and six times the telephone lines now built. It has taken six years for Congress to appropriate enough money to build this small part of what is urgently needed. The standing timber alone on National Forests is worth not less than five hundred million dollars. In twenty years it will probably be worth well over one billion dollars. If Congress gave the Forest Service the five hundred thousand dollars a year it asks for, to build trails and telephone lines, it would give only one-fourth of one per cent of the value of timber standing to-day in the National Forests.

The preservation of this standing timber controls the preservation of stream flow, whose value is many times that of all the wood which the National Forests contain. The value of the range in National Forests which again is largely dependent upon forest preservation, is incalculable. The fees for grazing alone bring into the public treasury every year twice the appro-

priation asked for trails and telephone lines. Without these improvements the forests cannot be made safe, even with ten times the present patrol.

The one million dollars asked for actual fire fighting and cut by the Agricultural Committee to one-fifth that amount, is simply a fund made available for the use of the Forest Service in times of grave emergency. It may be less necessary than the money required to build roads and bridges, telephone lines, and trails. Unless the fires occur, this money would be neither needed nor spent. But should the need arise there could be no more criminal extravagance than not to spend it. It cost \$900,000 beyond the appropriation of the Service to fight the big fires of 1910. If this money had not been spent, these fires would probably have wiped out the bulk of the forests of Northern Idaho, Montana, and Western Washington.

Fires have already broken out on National Forests in the Southwest as the result of the exceptionally light precipitation this winter. It would be hardly less unpatriotic and unwise to withhold money to equip troops against an invading army, than to refuse the appropriation needed to fight these fires and prevent the greater fires which may easily follow.

The Agricultural Appropriation Bill will soon be up in the Senate, and every friend of the National Forests is urged to raise his voice on behalf of adequate appropriation for protecting them.

The first forest fire for the year has been reported at the office of the Tahoe National Forest. Supervisor Bigelow reports that sixty acres of land on Squaw creek, in the canyon of the north fork of the American river, caught fire on February 24 and burned for two or three days.

Requisitions have been made by the Supervisors of 20 of the National Forests within the Second United States Forestry District, with headquarters in Denver, for 10,000,000 trout fry. Efforts of Colorado to restock high altitude streams and lakes will be greatly enhanced by the coöperation of the Forestry officials.

Twenty-eight forest service timber sales, some of them very large ones, have been in progress on the Kootenai National Forest during the winter. A number of sales are nearing completion, and the field force of forest officers who have been employed on the sales are beginning preparations for the coming season's field work.

REVIEW VOL. VI, NO. 2, PROCEEDING SOCIETY AMERICAN FORESTERS

This issue of the *Proceedings of the Society of American Foresters*, which appeared in October, 1911, contains a number of articles of particular interest to professional foresters. The opening paper, "The Essentials in Working Plans for National Forests," by Barrington Moore, states briefly the author's views as to what should be included in a typical working plan for a National Forest. A general outline is presented showing the arrangement of the topics to be treated in the working plan, with brief notes as to some of the more important of these. The paper is a very suggestive one and should serve to bring about further discussion of this important subject.

Another technical paper is one on "Seed Production and How to Study It," by Raphael Zon and C. R. Tillotson, in which the authors review at some length the efforts made by European foresters to solve the problem of seed production. They point out that but little accurate information concerning seed production has been obtained by these studies, and present a new method of investigation originally suggested by a Russian forester. Briefly, this method aims to determine the average amount of seed produced per unit area in a given forest type by means of sample plots whose seed production is accurately determined by the study of representative trees. The article deals in an original way with an important subject which has so far received comparatively little attention in this country.

Dr. B. Herstein, Technical Expert of the Tariff Board, under the title "Conservation and Chemical Pulp," discusses the possible utilization of sulphite waste liquors resulting from the manufacture of wood pulp. At present no use whatever of these liquors is made in this country, and they are simply run into the rivers which are becoming seriously contaminated by them. Dr. Herstein points out that a process has now been perfected by which this sulphite liquor can be converted into alcohol at a reasonable expense, and cites a plant in Sweden which now produces 300,000 gallons of alcohol per

year from this source. The economic saving which this method makes possible is obvious, but perhaps its greatest value lies in doing away with the indiscriminate pollution of rivers by the waste liquids.

Forest fires are discussed in two articles: one by W. B. Greeley, entitled "Better Methods of Fire Control," and one by I. F. Eldredge entitled "Fire Problem on the Florida National Forest." Mr. Greeley presents an admirable discussion of the entire problem of fire protection under the heads of patrol, communication, transportation, emergency help, equipment, and fire-fighting organization. Each of these subjects is thoroughly discussed from a practical point of view, and the conclusion is emphasized that fire-fighting is a matter of scientific management just as much as silviculture or range improvement. Mr. Eldredge points out very clearly the difficulties of fire protection on the Florida National Forest. His belief is that under present conditions complete fire protection is a hopeless ideal, and that the best policy is to protect all cut-over and experimental areas, and to burn the rest of the forest lands annually early in January when the surface fires are easily controlled. He emphasizes the importance of securing the cooperation of the settlers and of gradually extending the area protected.

One of the most valuable and timely papers in this issue is a bibliography of the Southern Appalachian and White Mountain regions, compiled by Miss Helen E. Stockbridge. This makes available for the first time an exhaustive list of the books and articles dealing with these two regions. The literature is classified under the following subject heads:

1. National Forest Movement;
2. Topography and Resources in General;
3. Botany;
4. Forests and Forestry: Forest Influences;
5. Water resources;
6. Climatology;
7. Geology;
8. Mines and mineral resources;
- and 9. Soils.

Altogether, this issue of the *Proceedings* is one of unusual interest.

S. T. D.

One thousand dollars a day will be put into circulation in northern California during the next fifteen years through the sale of a large tract of government timber which the Forest Service is now advertising for bids. The sale includes about 2,100 acres of excellent sugar and yellow pine on the Shasta National Forest. The estimates show that nearly 200,000,000 board feet of timber is included upon this area.

STATE WORK

Pennsylvania

At the annual meeting of the Pennsylvania State Foresters at Harrisburg on March 6 and 7, Pennsylvania, commended for the advanced position it has taken in conservation and in forestry management with its 972,000 acres of preserves, was warned to take the best protective measures possible against forest fires by Prof. Filibert Roth, of the University of Michigan, and F. A. Gaylord, of the New York Conservation Commission. Prof. Roth declared that stumps were monuments of ignorance and asserted that they could be made to yield handsome returns if properly handled.

Prof. Gaylord urged that the foresters be put to work to erect telephone lines, which, he said, had been done in his State at a cost of from \$7 to \$9 a mile, and which had proved of great value in calling men to aid in fighting fires.

William F. Daguerre, of Clearfield, talked on the protection afforded by taking out stumps and waste and the income produced therefrom; T. Roy Morton, Petersburg, on more rapid growth; Prof. E. A. Zeigler, Mont Alto, on early returns, and Harold E. Bryner, New Germantown, on clearing methods. In the afternoon the papers were by foresters, including John A. Bastian, Loyalsock; James E. McNeal, George H. Wirt, Lewis E. Staley, Harry A. Thompson and Forrest H. Dutlinger, who declared roads and markets should be studied, as the two went hand in hand, and who predicted that, with better roads, the State's income from forests would increase.

Much time was devoted to the business side of forest management in the papers of Foresters John W. Seltzer, Coburn; John L. Strobeck, Croscio; Homer S. Metzger, Logantown; Walter D. Ludwig, Boalsburg; John R. Williams, Rector, and D. H. Warfield, Milroy.

Former Congressman N. W. Wheeler and T. D. Collins, of Forest County, both of them lumbermen, spoke of the financial benefits, while former Mayor E. A. Weimer, of Lebanon, and Forestry Commissioner S. B. Elliott, recommended more planting and the extension of precautionary methods to prevent forest fires. Prof. I. T. Worthley and Joseph Illick, of the Mount Alto Forestry Academy, dealt with the question of management in reference to getting the best out of rangers.

California

There were 326 more forest fires in California during 1911 than during 1910, and 426 more than in 1909, according to a report by State Forester G. Morris Homans, in which

he gives the area burned over, cost of fighting, etc. The total damage in 1911, however, was only a little more than one-fifth as great as in 1910, but somewhat greater than in 1909.

During 1911 there were 1,064 forest fires, against 738 in 1910 and 638 in 1909. The total damage during 1911 was \$128,451.50 against \$628,989.20 in 1910, and \$100,000 in 1909.

The area burned over in 1911 was 55,182 acres of forest land and 227,102 open chaparral land; in 1910, 216,069 acres of forest lands and 303,394 acres of chaparral; in 1909, 76,730 acres of forest land and 279,539 acres of chaparral.

Wisconsin

With the view of developing a plan for the utilization of the millions of acres of cut-over lands in Wisconsin, the United States Government has decided to make extensive experiments in forest on the Sparta military reservation. The military reservation contains 20,000 acres, a large part of which is available for the experiments which are to be under the immediate direction of W. B. Piper, supervisor of the Marquette and Michigan national forests, and are to start at once. Pines from Northern Minnesota are to be planted principally.

The entire northern half of Wisconsin was until comparatively recent years, occupied by extensive pine forests, which have almost all been cut, and while much of the denuded land is valuable for agricultural purposes, a large part of it can be best employed for the development of new forests as soon as the method of handling and growing them has been well worked out.

Minnesota

A meeting of the representatives of Central and Northern Minnesota railroads was held at Duluth recently with W. T. Cox, the State forester, and other representatives of the State and National Forestry Departments. The meeting was for the purpose of discussing fire prevention and methods for accomplishing the best results. W. H. Gemmell, general manager of the Minnesota and International road, was chairman of the meeting.

The railroad men say that they will make it their business to give careful attention to fire prevention which costs the roads not only for property that may be destroyed and judgments procured by settlers, but the loss of vast sums in prospective freights by the destruction of timber by fire.

Michigan

That the Northern Forest Protective Association, organized in Marquette in the fall

of 1910, has accomplished much in preserving the forests of the upper peninsula and guarding against disastrous fires during the past year, was made evident at the first annual meeting of the Association, held in Marquette, Mich., recently.

The report of Secretary-Forester Thomas B. Wyman, of Munising, shows that the total loss sustained to property in the upper peninsula from forest fires during 1911, exclusive of regeneration and occurring after the establishment of the Association's patrol system, was less than \$6,000. Of this amount a considerable portion was owned by non-members of the Association.

New Hampshire

A review of great results already accomplished by the Society for the Protection of New Hampshire Forests is presented in the tenth annual report. Much has been done to preserve the wonderful natural resources of the State, but more remains to be done. On the Society's program are:

Enlargement of the State forest areas.

Effective cooperation with Federal officials in the purchase of a National forest in the White Mountains.

Extension of properly managed town forests, as a source of continuous revenue.

Encouragement of an equitable system of forest taxation.

Education of woodland owners in a wise use of their timber with a view to future returns.

Stimulation of tree planting throughout the State and the creation of new forests to take the place of those cut off.

Iowa

Four vital agricultural bulletins and circulars have just been issued by the Iowa Agricultural Experiment station for general distribution. No. 127, "Spraying Practice for Orchard and Garden," is a complete compendium on that subject, written by Prof. S. A. Beach, head of the horticultural and forestry section of the experiment station. The bulletin describes all orchard diseases common to the Mississippi valley and tells how to fight them as well as the various pests that cut down orchard yields.

Colorado

The Colorado State Forestry Association held its twenty-seventh annual meeting Feb. 15-16. It carried out a good program and closed with a banquet on the evening of the second day which was made exceedingly interesting by the presence of the Presidents of the Colorado College, the State Teachers' College, the State Agricultural College and the State University. It will take those who attended a long time to forget the occasion.

Nine directors were elected, the same persons for the third time consecutively, one of the number, General Irving Hale, being seriously ill the Hon. John H. Gabriel was chosen by the other members of the board

to serve in his stead. The board now stands as follows: A. Lincoln Fellows, J. H. Gabriel, Mrs. Helen L. Grenfell, W. A. Hover, Jacob Fillius, Mrs. Louise Brooks, C. K. McHarg, E. C. van Diest and W. G. N. Stone.

Kentucky

For the past six years Hon. W. H. Mackey, of Covington, Ky., has been endeavoring to have the State Legislature pass a bill creating a Forestry Bureau and he has recently succeeded. The Bill is now in the hands of the Governor and it is expected will be approved by him. While the appropriation is not large it will doubtless grow year by year. Anyway Mr. Mackey has got the work started and he deserves a great deal of credit for the effort that he has made. The Forestry Board will consist of five members, and the State Forester must be a graduate of a forest school and a technically trained forester. The appropriation is to be \$20,000.

Ohio

George W. Miller, chairman of the committee on agriculture of Ohio, writes that his committee has sent the following rough draft of a proposal to the Constitutional Convention which will shortly consider it:

"The general assembly may, in order to encourage the propagation, planting and cultivation of forestry, pass laws exempting from taxation, in whole or in part, wood lots or plantations devoted exclusively to the growth of forest trees.

"The general assembly may make further provisions granting the State authority to reforest and hold as forest reserve such lands or parts of lands that may be forfeited to the State or that may be acquired by the State."

Maryland

A bill has been introduced in the Maryland State Senate by Senator Benson calling for an appropriation of \$10,000 annually for carrying on the work of the State Board of Forestry, under the direction of the State Forester, and a special appropriation of \$6,000 for publishing the forest reports and forests maps of the several counties of the State. This is an increase over what has been heretofore appropriated, but this amount is required to meet the growing needs of the work; the need for increased fire protection alone, will require \$4,000 annually.

While the Agricultural College, the Experiment Station, the Farmers' Institutes, the Granges, the Farmers' Clubs and all the other agencies are working for the improvement of tilled lands, there is *only one*—the Board of Forestry—working for the improvement and protection of the woodlands, although they represent more than one-third of all the State's land area and are so widely distributed as to be represented on practically every farm, either by woodlot or timber tract.

New York

For the purpose of securing better forest management, the Conservation Commission of New York State is perfecting arrangements to examine about thirty thousand acres of forest lands owned by the International Paper Company in Township 6, John Brown Tract, near Big Moose in Herkimer County. While this work will be performed under the direction of the Conservation Department, the expense will be borne by the Paper Company, which has expressed a desire to cooperate with the Department in practical conservation of the forest lands which it owns.

The Department will prepare a map of the area which is to be lumbered, showing the location and extent of various types of forest growth and the quantity of timber. On this data as a basis, the scientific lumber operations will be planned. The results will be not only a prevention of waste, but the perpetuation of the forest growth for the future.

The International Paper Company owns a larger area of lands in the Adirondacks from which it secures pulp wood supplies for its paper mills, and for many years the concern has been cutting timber conservatively, taking but few trees under twelve inches in diameter, leaving the smaller trees for reproduction and future supply of timber. The company desires to still further improve its lumbering methods and has sought the advice and assistance of the Conservation Commission, which has readily responded inasmuch as one of its duties is to conserve the forests protecting the important watersheds of the State.

Connecticut

In a recent talk at New Britain, Conn., State Forester Samuel N. Spring made an urgent plea for more strenuous efforts to protect the forests against fire. He told graphically how 1,000 fires last year had laid waste 50,000 acres of timber land. He brought home to New Britain a realization of its duty in the prevention of such waste and it was gratifying to learn that that city has paid more attention to fires in its surrounding woodlands than many Connecticut municipalities. In each city the fire chief is *ex-officio*, fire warden and because of manifold duties many fire chiefs, according to the speaker, have spent little effort along this line.

South Dakota

To provide for carrying out an agreement under which South Dakota school lands will

be exchanged for National forest land of equal area and value, President Taft has signed a proclamation which makes it possible for the State to select immediately 60,143 acres of land from the Harney and Sioux National forests. This will permit of indemnity selection by the State in place of school lands lying along and within the boundaries of the Black Hills National forest, which will become part of the forest.

Indiana

Because approximately 2,000,000 acres of land in Indiana is virtually lying idle, which might be producing timber of highest value, the State Board of Forestry has issued a bulletin to Indiana farmers and owners of woodlots impressing the need of systematic and intelligent culture of the Hoosier woodlot.

Florida

Dr. Raphael Zon, of the Forest Service, on a recent trip to Tampa to investigate the culture of eucalyptus there, said that the experiment, although not a spectacular success, is scientifically valuable as it shows the conditions under which the trees will thrive and establishes beyond a doubt that eucalyptus trees will flourish as well here as anywhere else in the country if given the proper care. In the experiments tried on Grand Central extension, there was practically no attention paid to the trees beyond planting them. They were set just before the dry season of last year and most of those which died succumbed because of lack of moisture. This was shown conclusively by the fact that in the lower ground where the moisture accumulated and remained much longer than in the high sand, the trees thrived fairly well.

Oregon

Oregon is going to have better forest fire protection this year than ever before in its history. It will have a larger appropriation from the Federal Government, greater help from individual timber owners and, it is believed, more liberal assistance from the State itself, judging from the expressions at the annual meeting of the Oregon Forest Fire Association. G. H. Cecil, in charge of the Government Forest Service in the Portland district, stated that the Federal Government had promised \$10,000 for fire protection the coming season, or \$5,000 more than last year. State Forester E. A. Elliott stated he believed the State would probably see it good business to appropriate \$100,000 for forest fire protection for the next two years, instead of \$60,000, the amount appropriated for the purpose during the past two years.

NEWS AND NOTES

Lumbermen and Forestry

The members of the National Wholesale Lumber Dealers' Association held a most enthusiastic meeting at Louisville, Ky., early in March, at which, following a report of the Forestry Committee, published in this issue, and an address by P. S. Ridsdale, executive secretary of the American Forestry Association, explaining what the organization is doing, resolutions endorsing the work of the Association were adopted.

These were as follows: *Resolved*, That the National Wholesale Lumber Dealers' Association heartily indorses the efforts of the American Forestry Association to secure better State and national fire protection of the forests. Also the effort to protect the head waters of streams and to secure a satisfactory system of time and land taxation and to advocate the use of woods and wood products; and be it further

Resolved, That the members of this Association lend their support to the American Forestry Association and to encourage subscriptions to its magazine, *AMERICAN FORESTRY* which is its medium of publicity and education, and be it further

Resolved, That this Association indorses the bill now before the Congress of the United States appropriating the sum of \$80,000.00 for the the scientific investigations and eradication of the disease commonly known as the chestnut tree blight, and be it further

Resolved, That any legislation which seeks to regulate the cutting of trees by prohibiting the cutting of all trees below certain specified diameters would be deemed to be adverse to the best interests of the lumbermen, unless such legislation recognizes the time honored rights of property by providing that compensation be made by the State to the owners of the trees which fall within the provisions of the proposed legislation.

Protecting the Forests

At a meeting held recently in Montreal, the St. Maurice Valley Forest Protective Association was formed, having for its object the protection from fire of the timber lands of the St. Maurice River Valley. This important river supplies large amounts of power for Montreal and Three Rivers by means of the Shawinigan Falls and also for the largest pulp and paper companies in this province.

Lookout stations will be established on high hills from which fires can be detected, and these will be connected by telephone with the nearest settlements, so that help can be obtained. Telephone lines and trails will be built and fire fighting tools placed in convenient locations. Educational work will be undertaken to teach the settlers and farmers the value of the forests and the necessity of protecting them.

The officers elected later at Quebec, are: President—Mr. Alex. MacLaurin, of Montreal, representing the Union Bag and Paper Co.

Vice President—W. R. Brown, of the Quebec and St. Maurice Industrial Co.

Directors—Messrs, R. S. Grant, St. Maurice Lumber Co.; Ellwood Wilson, Laurentide Pulp Co.; Frank Ritchie, Wayagamack Pulp and Paper Co., and H. Biermans, Belgo Pulp and Paper Co.

Following the election of officers a banquet was given at which Mr. W. R. Brown presided. Speeches were made by W. C. J. Hall, head of the Fire Protection Department; G. C. Piche, head of the Forestry Department; Hon. J. Bureau, attorney general of the Dominion; A. Tessier, M. P., and others.

The Association comprises 87 per cent of the timberland holders of the St. Maurice Valley, and is the largest ever formed there, representing 7,000,000 acres. The assessment is one-fourth of a cent an acre per year for protection. The Provincial Government gives \$3,000 and one head inspector authorizes all rangers to aid, also pays one-third the cost of fire protection on the railroad service and one-third the cost of fire fighting. Henry Sorgino, of Montreal has been appointed manager.

Experiments in Wisconsin

With the view of developing a plan for the utilization of millions of acres of cut-over lands in Wisconsin, the United States Government has decided to make extensive experiments in forestry at the Sparta Military Reservation according to word received here today from Congressman H. J. Esch, who took up the matter with the War Department and the Department of Agriculture.

The military reservation contains 20,000 acres a large part of which is available for the experiments which are to be made immediately at the direction of W. B. Piter, supervisor of the Marquette and Michigan National Forest Association, and are to start at once. Pines from Northern Minnesota are to be planted principally.

Forester Hirst's Views

State Forester E. C. Hirst, of New Hampshire, in speaking before the Portsmouth, N. H. Y. M. C. A., recently said: "Aside from the natural conditions, New Hampshire is well situated geographically for the practice of forestry. In the middle West the timber supply is rapidly diminishing and the pine in the Southern States is being heavily cut. The Northeastern States contain large areas of natural forest land on which the eastern part of the country will more and more depend for its timber supply.

Moreover this land is situated for the most part near the large markets where the good prices secured for timber will make the practice of forestry more profitable as the years go by.

"It is about time for us to look ahead to this increasing demand for timber, protect from fire the growth we have, cut out worthless trees and make room for better ones, and plant good fast growing trees on our waste land. This is true forestry—the raising of repeated crops of timber on non-agricultural land."

Wood Products Exposition

Agitation for a Woods Products Exposition in this country this year is now being aroused by Editor Arthur Bolling Johnson, of the *Lumber World Review* of Chicago and there is every prospect that it will result in such an exposition as is desired. Detailed plans for the affair are to be proposed in a short time and in the meantime Editor Johnson is busy stirring up enthusiasm for it.

A Large Sale

The sale of 800,000,000 feet of pine, fir and cedar saw timber in the Sierra National forest along the east side of the San Joaquin Valley has been announced by the Department of Forestry and if consummated, this will be the biggest sale of timber ever operated by the Government. The Department will soon invite bids for this timber, offering contracts of twenty years in which to remove the timber, with two additional years for the construction of necessary improvements.

The announcement of the timber sale is expected to attract much interest among lumber men, as the timber is the most valuable yet offered for sale by the Government anywhere in the West. The Forestry Department is publishing an announcement of the sale, calling for bids.

Forestry Without Politics

The taking of the Forestry Service, both Dominion and Provincial, out of politics, making way for technically trained men, was advocated by G. Y. Chown, president, at the annual Canadian Forestry Convention which opened at Ottawa, recently. He also declared for a permanent forest policy, and for some efficient method of guarding against forest fires.

In an address of welcome to the delegates, Premier Borden compared Canada to a young man who had inherited a vast estate and who, unless carefully watched, was liable to squander his wealth. He especially urged the association to impress both legislators and the people with the necessity of checking the forest fire evil.

"There are some things on which the Prime Minister and myself can agree," said

Sir Wilfred Laurier, "and the conservation of forests is one of these."

The Leopard Moth

The leopard moth more feared in its work of destroying trees than the brown tail and gypsy moth, has made its appearance in Waltham, Mass.

The pest has been discovered by employees of the City Forestry Department in three widely separated sections of the city.

There are two ways in which the moth may be killed. One is to spray a chemical oil into the holes where the moth has entered and block the holes up. A gas is formed which destroys the pest. The other is to use hot irons to burn the larvae.

Money for Fire Sufferers

Relatives of 32 men who lost their lives and many men who were injured while fighting fires in the Coeur d'Alene national forest near Wallace, Idaho, the summer of 1910, are sought by Roscoe Haines, supervisor of the forest, stationed at Coeur d'Alene, Idaho, regarding the distribution of the recent appropriation by Congress for forest fire sufferers.

Few of the men, who came from various parts of the United States and Canada, and enlisted to fight fire, gave their home addresses, hence the Forest Service has been unable to get into touch with relatives of the dead and injured.

New Firm of Forest Engineers

A new firm of forest engineers has recently opened offices in Philadelphia under the name of Clark, Lyford & Sterling. The members are Judson F. Clark, of Vancouver, B. C., C. A. Lyford, of Montreal, Que., and E. A. Sterling, of Philadelphia. Mr. Clark and Mr. Lyford are also identified with the well-known firms of Clark & Lyford, Vancouver, B. C., and Lyford, Clark & Lyford, Montreal, Que. Mr. Sterling has resigned his position as Forester of the Pennsylvania Railroad, which he has held for the past five years.

This organization is making a specialty of timber estimates and forest maps, and is prepared to examine and report on timber properties anywhere.

Chestnut Tree Disease

Marsden Manson, of San Francisco, Cal., writing in *Science* says: "In connection with the chestnut tree blight, I call attention to the hardy giant chinquapin of the Pacific States. This may be a resistant species adaptable to the Southern States. It occurs in two varieties, the one just mentioned and a dwarfed variety. The former reaches a height of 120 feet and has a diameter of from 8 to 10 feet; ordinarily from 40 to 55 feet in height and from 1 to 2 feet in diameter. Locality, near Willets in Mendocino County, Cal. The dwarfed form is

abundant in the Cascade and Sierra Nevada and San Jacinto mountains from 2,000 to 9,000 feet. It is mostly of shrubby habit, but to all appearances identical with the giant Chinquapin. This latter is a hardy and long-lived tree of stately and handsome form. The timber is suitable for many purposes, saws readily, is fine grained and light brown. The burr and nut of both varieties are almost identical in size and appearance with the eastern chinquapin. They are difficult to obtain and are frequently attacked by a small whitish worm, the egg of which is deposited, as in the eastern chinquapin and chestnut, by a moth.

The writer suggests that the giant chinquapin be experimented with as a possible resistant species to reforest the Eastern States devastated by the chestnut tree disease. The tree would probably stand the eastern conditions south of Maryland. The shrub is extremely hardy.

Forest Eliminations Ordered

The President has signed a proclamation eliminating approximately 73,100 acres from the Jefferson National Forest, Montana. A very careful examination made by the Forest Service had shown that the land was not chiefly valuable for forest purposes but consisted mainly of open grazing land and land of agricultural value.

The lands excluded lie mainly along the southern and eastern boundaries of the Little Belt division of the Forest. Small eliminations were also made from the Highwood Mountains, Little Rockies, and Snowy Mountains divisions.

The eliminated lands were by the same proclamation withdrawn under the Act of June 25, 1910, for classification, and will, when compatible with public interests, be restored to settlement and entry on such dates as shall be fixed by the Secretary of the Interior and after such notice as he may deem advisable.

EDUCATIONAL

Public School Instruction

That merchantable white pine can be grown in 30 years, norway pine in 35 and that a cedar swamp, lumbered to-day, will in a period of 15 years yield the same market value in commercial material as the previous cut, providing that fire does not interfere with such growths, is the information brought to the pupils of the Sault Ste. Marie, Mich., public schools recently by Deputy State Forestry Warden J. H. McGillivray, of Oscoda.

Instructors Talk

At the 27th annual meeting of the Colorado State Forestry Association at Denver recently, President Baker, of the State University, talked on "Forestry and Culture"; President Slocum, of Colorado College, on "What the Colorado School of Forestry Means to the Great West"; President Lory, of the Agricultural College, told what his institution will do for the farm by the aid of forestry, and President Snyder, of the State Normal, spoke on "The Spirit of Forestry."

Professor Ellsworth Bethel, of the East Denver High School, discussed "The Aesthetic and Educational Value of Public Parks," and urged the establishment of the office of city forester. W. W. Williamson, of Colorado Springs, discussed, "Shall the Public Domain With the National Forests, Be Turned Over to the State?"

Dean Toumey's Views

Dean Toumey, of the Yale Forestry School, in addressing the graduates recently, said:

"During the past two years many students in American forestry schools and possibly

some of you, have become more or less pessimistic, not so much because of the lack of faith in the future of American forestry, but because of the belief that there is a danger that the profession will become overcrowded, and opportunity for responsible work and advancement curtailed.

"During the decade ending with 1910 every man, good, bad and indifferent found a position awaiting him on the completion of his professional training. Many of these positions have been retained by men who will not be able to retain them in the future. The weeding out process in professional forestry in this country has already begun and who will deny that this is a splendid thing for the profession. Weeding out carries with it no fear for the competent man. You need have no fear of the overcrowding of the profession at the top. There are now and always will be shown by your own work that you are the best men to fill them.

Forestry at Cornell

If the approval of the trustees is forthcoming Cornell will soon have a course in forestry leading to the regular baccalaureate degree at the end of the fourth year and to the degree of master in forestry at the end of the fifth year. The university faculty has recommended this action and asked the trustees to establish the new degree.

Details of the course have not been worked out, but the entrance requirements will be the same as those for the course in agriculture. The first two years will be similar to those of the present course in agriculture except that solid geometry and trigonometry will be required if they have not been offered for entrance. In the junior year work in general science will be continued, supplemented by some surveying in the College of

Civil Engineering and the beginning of work in technical forestry. The fourth and fifth years will be devoted mainly to work in forestry, with some work in engineering.

Seeking Information

J. P. Wentling, assistant professor of forestry in the agricultural department of the State University of Minnesota, has written County Superintendent Boerger asking him to appoint two observers of forestry in Stearns County. The idea of the department is to have at least two of these observers in each county of the State to report on the time of leafing, blossoming and fruiting of the various kinds of trees.

The department is starting out to secure as nearly exact data concerning the trees of the State as is possible. Competent observers, whether teachers of botany or persons well posted in botany are required for the work.

Chances for Several States

Provided a bill is passed which is now pending in the United States Senate, asking

that five per centum of the gross receipts from national forests during any fiscal year, beginning June 30, 1912, shall be available for the purpose of maintaining a school of forestry in the States in which national forests are located, several States will have a school of forestry, to be part of the curriculum of studies of some State institutions.

Students' Experiences

That the young foresters of Oregon Agricultural College can live on their own cooking and conduct a regulation foresters' camp, has been demonstrated by Professor Peavy, head of the school of forestry, who with the ten members of his class in forest mensuration has been passing the last four days in cruising a 640-acre tract of timber in the hills west of Philomath. The boys made a careful study of the forest conditions existing in that type of region, relative to the availability of the timber for lumbering purposes, and were incidentally introduced to the canthook, measuring stick and calipers and taught their uses.

CURRENT LITERATURE

MONTHLY LIST FOR MARCH, 1912

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Yale forest school. A classification for forestry literature. 6 p. New Haven, Conn., 1912. (Yale forest school. Bulletin 1.)

Proceedings and reports of associations, forest officers, etc.

Canadian forestry association. Brief report of the 13th convention and annual meeting, held at Ottawa, February 7-8, 1912. 20 p. Ottawa, 1912.

Deutsche dendrologische gesellschaft. Mitteilungen, No. 20. 530 p. il. Bonn-Poppelsdorf, 1911.

India—Andaman Islands—Forest department. Progress report of forest administration in the Andamans for 1910-11. 34 p. Calcutta, 1911.

Maryland—State board of forestry. Report for 1910 and 1911. 42 p. pl. Baltimore, Md., 1912.

North Carolina—Geological and economic survey. Second annual convention of the North Carolina forestry association. 4 p. Chapel Hill, N. C., 1912. (Press bulletin 59.)

Oregon—State board of forestry. First annual report, 1911. 24 p. Salem, Ore., 1912.

Prussia—Ministerium für landwirtschaft, domänen und forsten—Abteilung für forsten. Amtliche mitteilungen, 1910. 51 p. Berlin, 1912.

Quebec—Department of lands and forests. Report for the 12 months ending 30th June, 1911. 134 p. Quebec, 1912.

Rhode Island—Commissioner of forestry. Sixth annual report, 1911. 45 p. pl. Providence, 1912.

Russia—Lyesnoi department (Forest dept.) Ezhegodnik (Year-book), 1909, v. 1-2. S.-Peterburg, 1911.

Forest Education

New York state college of forestry, Syracuse university. Announcement, 1912. 20 p. Syracuse, N. Y., 1912.

Forest Legislation

Connecticut—State forester. Forest fire manual; Connecticut laws relating to forests. 54 p. New Haven, Conn., 1912.

Forest Description

Hungary—K. ackerbauministerium. Exkursionsführer im auftrage se. exc. des K. Ung. ackerbauministers zusammengestellt anlässlich der studienreise des Österreichischen reichsforstvereines nach

Südungarn und den Slavonischen eichenwäldern, 1911. 113 p. maps. Budapest, 1911.

Maryland—State board of forestry. The forests of Allegany county, by F. W. Besley. 31 p. pl., maps. Baltimore, Md., 1912.

Maryland—State board of forestry. Re-forests of Kent county, by F. W. Besley. 27 p. pl., maps. Baltimore, Md., 1911.

Silviculture

Planting

Ferguson, J. A. Growing a woodlot from seed. 8 p. il. Columbia, Mo., 1912. (Missouri—Agricultural experiment station. Circular 52.)

Hill, D., nursery co., inc. The forest planter's guide. 24 p. Dundee, Ill., 1912.

New Zealand—Department of lands. Report on state afforestation, 1910-11. 74 p. pl., maps. Wellington, 1911.

Forest Protection

Insects

O'Kane, W. C. The gypsy moth. 4 p. il. Durham, N. H., 1912. (N. H.—State moth agent. Circular 1.)

O'Kane, W. C. The browntail moth. 4 p. il. Durham, N. H., 1912. (N. H.—State moth agent. Circular 2.)

Fire

Greeley, W. B. Better methods of fire control. 13 p. Wash., D. C., Society of American foresters, 1911.

Oregon forest fire association. First annual report. 17 p. Portland, Ore., 1911.

Peters, J. Girvin. Forest fire protection under the Weeks law in coöperation with states. 15 p. il. Wash., D. C., 1912. (U. S.—Department of agriculture—Forest service. Circular 205.)

Forest Management

Forest organization

Wörnle, Paul. Die zweckmässige grösser der forstbezirke in Württemberg, 54 p. Tübingen, H. Laupp, 1911. (Wagner, C. Unsere forstwirtschaft im 20. jahrhundert, pt. 4.)

Forest finance

McGrath, T. S. Timber bonds, 504 p. Chicago, Craig-Wayne Co., 1911.

Forest Economics

Statistics

Macmillan, H. R., & others. Forest products of Canada, 1910; pulpwood. 14 p. Ottawa, 1911. (Canada—Department of the Interior—Forestry branch. Bulletin 26.)

Macmillan, H. R. Forest products of Canada, 1910; tight and slack coöperage.

11 p. Ottawa, 1911. (Canada—Department of the Interior—Forestry branch. Bulletin 27.)

Forest Administration

National and state forests

United States—Department of agriculture—Forest service. National forests; location, date, and area, Dec. 31, 1911. 4 p. Wash., D. C., 1912.

Forest Engineering

Schill, P. Forstvermessung; ein lehr—und handbuch. 246 p. il, tables. Eisenach, H. Kahle, 1911.

Forest Utilization

Lumber industry

Lumbermen's credit association. Reference book, February, 1912. Chicago and New York, 1912.

Wood preservation

Ferguson, J. A. How to prolong the life of fence posts. 4 p. il. Columbia, Mo., 1911. (Missouri—Agricultural experiment station. Circular 51.)
Maryland—State board of forestry. Increasing the durability of fence posts, by F. W. Besley. 22 p. il. Baltimore, Md., 1912.

Auxiliary Subjects

Conservation and natural resources

Canada—Commission of conservation. Second annual report. 230 p. Ottawa, 1911.
Canada—Commission of conservation. Lands, fisheries and minerals. 519 p. pl, maps. Ottawa, 1911.
Canada—Commission of conservation. Water-powers of Canada. 397 p. pl. Ottawa, 1911.
New York—Legislature—Joint committee on the conservation of water. Report, 1912. 83 p. Albany, N. Y., 1912.

Periodical Articles

Miscellaneous periodicals

Agricultural journal of the Union of South Africa, Jan. 1912.—Forestry and plantation work in Britain, by J. Sim, p. 71.
British Columbia magazine, Dec. 1911.—Vancouver Island timber and reforestation, by Ernest McGaffey, p. 1239-45; A cyclone among the timber Titans, by H. H. Jones, p. 1287-93.
Bulletin of the American geographical society, Feb. 1912.—The forests of the Philippines, by J. Paul Goode, p. 81-9.
Civic quarterly, Jan. 1912.—The proposed Estes national park, by R. Johnson, p. 16-21.
Editorial review, Feb. 1912.—Is there a lumber trust, by R. Seelav, p. 127-37.
Field and stream, March 1912.—American forestry, by Warren H. Miller, p. 1140-45.

Journal of the Linnean society, Feb. 1, 1912.—An ecological study of a Cambridge-shire woodland, by R. S. Adamson, p. 339-84.

Nature, Jan. 4, 1912. Forestry education at the University of Edinburgh, p. 328-9.

Plant world, Dec. 1911.—Establishment behavior of the palo verde, by F. Shreve, p. 289-96.

Popular science monthly, March 1912.—Glimpses of the Great American desert, by R. J. Pool, p. 209-35.

Saturday evening post, Feb. 3, 1912.—Working to save wood waste, by F. Crissey, p. 8-10.

Scientific American, Feb. 24, 1912.—Trees that yield butter; how nature competes with the dairy, by W. R. Gerard, p. 175; Durability of wood cut in spring and in summer, p. 185.

Scientific American, supplement, Dec. 23, 1911.—Skis; their construction and use, p. 411.

Sierra club bulletin, Jan. 1912.—The Devil's Portpile, by J. N. Le Conte, p. 170-3; National parks, p. 217-35; Are national parks worth while, by J. H. McFarland, p. 236-9.

Torrey, Feb. 1912.—Winter-killing and smelter-injury in the forests of Montana, by George Grant Hedgcock, p. 25-30.

Trade journals and consular reports

American lumberman, Feb. 17, 1912.—Improvements in wood charcoal manufacture, p. 39; New "sugi" finish on cypress, p. 65.

American lumberman, Feb. 24, 1912.—Forest industry, by E. T. Allen, p. 48-9; Preservation of wood with antiseptics, p. 72; Conference on chestnut tree blight, p. 73-5; Short cut improvements in timber cruising, by E. A. Braniff, p. 82; Poisonous woods, p. 85; Wood used in phylography, p. 97.

American lumberman, March 2, 1912.—Wood flour in demand, p. 33; Treatment of orchard and ornamental trees, by J. F. Collins, p. 34; Specifications for manufacturing silo stock, p. 42-3.

American lumberman, March 9, 1912.—Standard specifications for silo stock, p. 42; Silo construction, by A. M. Dolve, p. 44; Oregon forest fire association; instructive addresses feature annual meeting, p. 57-60; Northern forest protective association; annual meeting, p. 61.

Canada lumberman, Feb. 15, 1912.—Taxation on timber lands in B. C., p. 26-7.

Canada lumberman, March 1, 1912.—The Indian as a fire-ranger, p. 27-8.

Engineering news, Dec. 14, 1911.—Notes on railway ties, p. 705.

Engineering news, Dec. 21, 1911.—Rapid destruction of timber beams from dry rot, by C. H. Smith, and F. J. Hoxie, p. 727-9.

- Engineering news, Jan. 4, 1912.—Machines for handling railway ties, by R. P. Black, p. 22-4.
- Engineering record, Jan. 6, 1912.—Wood block pavements in Chicago, p. 10.
- Hardwood record, Feb. 25, 1912.—Utilization of hardwoods; aeroplanes, p. 30-1; Wood used in artificial limbs, p. 37.
- Hardwood record, March 10, 1912.—Pattern making woods, p. 30.
- Lumber world review, Feb. 25, 1912.—Growing new forests in Wisconsin, p. 18; Efficient forestry methods, by C. S. Chapman, p. 22; Biltmore forestry school in Germany, by J. W. Agnor, p. 24.
- Lumber world review, March 10, 1912.—The silo a winner; good thing for the lumberman and the stockman, p. 34 a.
- Journal of electricity, power and gas, March 2, 1912.—Tests on insulator pins from California eucalyptus, p. 202-3.
- Mississippi Valley lumberman, Feb. 16, 1912.—Lumber trade with our Southern neighbors, p. 40-1; Forest fire fighting in Minnesota; State forester holds conference with the railroads, by W. T. Cox, p. 42-3.
- Mississippi Valley lumberman, March 8, 1912.—Silos as a side line for retailers, p. 42-3.
- Paper mill, Feb. 17, 1912.—The pulp wood resources of Dominion of Canada, p. 92-8.
- Paper trade journal, Feb. 8, 1912.—A Canadian forest survey, by J. W. Sewell, p. 56, 60.
- Paper trade journal, Feb. 15, 1912.—Estimate of pulp wood standing in Canada, p. 61-3; Forest engineering, by C. J. Blanchard, p. 209-11; Reforestation and utilization of forest products in Europe, p. 213-19; Some uses of paper and fibre, by A. P. Dillont, p. 221-5; Life in a lumber camp, by R. O. Sweezey, p. 225-31; Woods for the manufacture of mechanical pulp, by M. Cline, p. 231-5; Japanese paper plants, by R. Raines, p. 239-43; Conservation of national resources, by M. H. Hoover, p. 251-7; Logging in Maine woods, by P. H. K., p. 261.
- Pioneer western lumberman, March 1, 1912.—Redwood in Humboldt county; its high quality; its 1911 shipments, by L. M. Nevens, p. 21-3.
- Pulp and paper magazine of Canada, Feb., 1912.—The forestry engineer, by R. O. Sweezey, p. 48-9.
- Railway age gazette, Feb. 9, 1912.—The railway's interest in forest fire prevention, by E. A. Sterling, p. 231-5.
- St. Louis lumberman, Feb. 15, 1912.—The Browning locomotive crane, p. 60-2; The silo end of the lumber business, p. 82 C-D.
- St. Louis lumberman, March 1, 1912.—New Zealand paving methods and materials, by H. D. Baker, p. 26.
- Southern industrial and lumber review, Feb., 1912.—The "sugi" finish on cypress, p. 28-30.
- Southern lumberman, March 2, 1912.—Furniture and cabinet woods of the Philippines, by H. N. Whitford, p. 36-7.
- Southern lumberman, March 9, 1912.—What is pin oak, p. 25.
- Timberman, Feb., 1912.—Comment on the new system of taxing timber proposed by the Timberman, p. 19; First Australian forestry conference plans conservation campaign, p. 32; National foresters and California lumbermen hold lively conference, p. 52-3.
- United States daily consular report, Feb. 21, 1912.—Basket making in Jamaica, by J. D. Dreher, p. 782-3.
- United States daily consular report, Feb. 24, 1912.—The French cork industry, by F. M. Mansfield, p. 804-6.
- United States daily consular report, March 13, 1912.—The French wood trade, by J. E. Dunning, and others, p. 1046-9; Doors and sash, by H. R. Dietrich, and others, p. 1049-50; World rubber trade, p. 1052-3.
- United States daily consular report, March 16, 1912.—Commercial woods of Africa, by W. J. Yerby, p. 1091-3.
- West Coast lumberman, Feb., 1912.—Market effect of creosoting upon lumber, by G. Winslow, p. 267-9.
- Wood-craft, March 1912.—African cedar for making cigar boxes, p. 173.
- Wooden and willow-ware trade review, Feb. 22, 1912.—Alder used for matches, p. 89.
- Wood-worker, Feb., 1912.—Wood distillation and how accomplished, by J. J. Blitz, p. 40-1.



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American Forestry

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THROUGH CANADIAN WILDS

By ELLWOOD WILSON

THE FORESTER'S life is not all beer and skittles. People say so often, "Oh! if I could only lead the free, open air life which you lead, next to nature, far away from the confined grind of the city!" But take these same people and give them the forester's daily life for three or four weeks, even under the best conditions, and see how quickly they would tire of it. This is especially true under the conditions which exist in the Canadian forests today. There are no roads or trails and a man's outfit must be carried on his back and by canoe in summer, and on a toboggan which he pulls in winter. The forests are a long way from the settlements, from thirty to one hundred and fifty miles, and there is no communication, so that letters and news of the outside world are few and far between. One sleeps in a tent at all seasons of the year and travels and works in all weathers. The three main divisions of the year are winter, from first of November till the first of May, fly time, from May fifteenth to first of August and fall. Fly time is the worst of all, as the flies, mosquitoes and gnats make life almost unendurable. With proper outfit and reasonable care the hardships are not great and after once getting broken into the life there is a great fascination in it.

One of the hardest times of the year is the latter part of November, before the ice on the lakes is thick enough to bear a man's weight and too thick to break a way through for a canoe. As

all travel is by way of the lakes and rivers, both in summer and winter, and the portages are only cut through the woods from one water way to another, when lakes cannot be crossed it is exceedingly difficult to go around them. One year, having a party in the woods surveying and estimating timber, I started about the middle of November to inspect their work and to take in the small sheet iron stoves which are used in the tents in winter and also snowshoes and mail. With me was a man who had never worked in the woods in the north before but who wanted to get the experience and who was to remain with the party. We started from our headquarters on a clear crisp day and drove in with our duffle loaded on a buckboard to the end of the road, about twenty-four miles to the depot of one of the lumber companies which lies at the foot of Lac Mistagance, a lake about twelve miles long. Here we put our birch bark canoe in the water and loaded up, with not much room to spare. A steady uneventful paddle brought us to the end of the lake and our stuff was unloaded and piled on the bank while we crossed the two mile portage to the next lake where our Company had a depot, the last outpost of civilization. Here we sent back a horse for our load and while it was being brought up we got together our provisions for the trip into the woods.

Bright and early the next morning we were off, taking with us an extra



A RANGER'S TENT IN WINTER—WITHOUT ALL THE COMFORTS OF HOME

canoe and two men to help us over the "Long Portage," seven miles. The weather was perfect and as we made the two short portages and crossed the two long narrow lakes to the beginning of our real day's work, it seemed good to be alive and the loads we carried only lent a zest and helped to keep us down to earth. Leaving one canoe at the beginning of the "Long Portage" for the packers to return in, we started out, stopping for lunch after a mile or so. We shot two or three grouse with our pistols, keeping them for our breakfast. About half past five we reached the other end and pitched our small Baker tent, spreading it to give some shelter to all four of us and after a hearty supper, were soon asleep.

In the morning we said good-bye to our packers and launching our canoe on the River Mattawin, a beautiful stream about seventy-five miles long and with many picturesque rapids, we started upstream. We had three portages and had to "double" them as our load was too heavy to be taken over in

one trip. Just before noon we reached the mouth of the Chienne River, a smaller stream emptying into the Mattawin, up which our route lay. Here we had lunch and after passing through two small lakes, where the river widened out, we found the water quite low and had to track our canoe through several swift waters. About four o'clock we made a short portage into Lac Brochet and to our great surprise found it frozen. This was something of a dilemma as we did not relish the thought of having to pack all our baggage around it and if it had frozen so early, many of the other lakes above would probably be frozen too. Trying the ice with our axes, and finding it fairly safe, I crossed by lying flat on my stomach so as to cover as much ice as possible and by tying four tump lines together we dragged the duffle across the narrow bay. Here we made a camp and as the night was clear did not trouble to put up a tent but crawled into our sleeping bags and were soon lost to the world. About three in the



A JOBBER'S CAMP IN THE HEART OF WINTER

morning I remember feeling chilly but was too sleepy to really wake up. When I did, I felt the most delicious warmth and as it did not seem very light I lay there enjoying the sensation for a few minutes, then throwing aside the blankets looked out and found that about eight inches of snow had fallen in the night and completely buried us.

My man complained of feeling sick, but as he had no temperature and his pulse was good I was rather inclined, especially after I saw the breakfast which he ate, to think it only a case of "cold feet." However, we decided to stay in camp for the day and leaving him in his bag, I pitched the tent, cut some boughs for beds and wood for the fire and packed our loads so that they would be easy to carry and spent the afternoon taking them as far up the lake as I could without running into bad going. The ice on the lake would not bear and as it seemed to be getting

colder the ice would probably be much thicker in the morning.

Next day, the invalid feeling better, we loaded our camp outfit into the canoe and hitching a tump line to the bow, one of us dragged it from in front, the other pushing behind, we went to the place where I had taken the duffle and loaded that in too. In case the ice gave way we expected to jump into the canoe. Nothing happened and we reached the other end of the lake. There the portage, about two miles long went right up the mountain in order to pass a beautiful fall, nearly sixty feet high. As we were heavily loaded and it was probable that we should find the next lake frozen, I took the snowshoes and a stove for our two loads, leaving the canoe for the second trip. There was about eight inches of snow and the going was pretty hard. When we reached Lake Virginia we found it partly frozen, and as the next

lake was long and narrow, being sheltered by high hills, we were sure it would be frozen too. The place where we expected to find the men camped was only five miles away in a straight line and I decided to push on and join them and bring back enough men to take all the baggage up in one load.

It had begun to snow again quite heavily and as the survey line we wanted to follow in order to take the most direct route ran up over a high cliff we started to go around it. After travelling about fifteen minutes I saw what I thought was the creek which ran out of the next lake above and we went down so as to find easier walking on its frozen surface. After following it for about one hundred yards we passed a place where the ice was thin and I noticed that the water was running the wrong way. This is a very uncanny sensation in the woods and it is hard to make one's self believe the evidence of one's senses. I realized however that in the fog and snow I had made a circuit and come back to the very creek from which we had started. Beginning again and with more care in travelling we reached the next lake and ate a couple of hardtack which we had brought for lunch.

The line we were following went right up the side of a mountain now and my companion was travelling so slowly, not being accustomed to the woods, that I told him to follow my trail and I would push on ahead. Coming to a little creek, I saw a grouse and tried, but without success, to get him with my pistol. About four o'clock we reached a small marshy lake and in crossing it I went through the ice up to my armpits. Crawling out and on shore, I stripped off my clothes and wrung them out as dry as possible and although they felt pretty chilly, started off again as we were anxious to reach the camp before it was too dark. The going was very rough and I had to wait several times for my man, so that it was seven when we reached Lac Crapaud, a small lake about three hundred yards from Grand Lac Chienne, at the head of which the men were camped.

Crossing the portage to the big lake, we found it open, so fired several shots and called, in the hope that some one in the camp would hear us and come for us with a canoe. There was quite a wind blowing and we heard no answer, so started along the shore in the dark for camp. There was no trail and the going was very bad. After about half an hour, however, we reached the long sandy beach at the head of the lake and with a sigh of relief went to the camping place. We had been talking all afternoon of the supper we would have, for the cook was famous, so that you can imagine our surprise when we found no sign of a camp. Only the empty fireplace of stones and the table of rough hewn logs.

I looked everywhere for a note or some sign to tell us where the men had moved but there was absolutely nothing, and it was hard to see anything in the dark. We made up a fire and built a rough lean-to of boughs, and a pile of them to sleep on and curled up close to the fire and were soon asleep. I woke up after a splendid night's sleep to find my companion shivering over the embers of the fire, the poor chap had not slept a wink and again complained of feeling ill. I sat down on a log to pull on my boots and as one side of me seemed rather chillier than the other I felt of my breeches only to find that I had slept too close to the fire and had a hole as big as my two hands burnt right through my heavy mackinaws. After making up a good fire I looked all around for a note or some sign which might tell us where the camp was, but in vain. No birch bark note, as was usual, had been left and the snow had effectually covered all tracks.

Food was of course the first consideration and I searched thoroughly to see if a cache had been left but found nothing. Then I remembered that on the western shore of the lake an old Indian had a tepee where he spent part of each year hunting and I tramped around the shore in the snow to it, but found nothing eatable, only a few old cooking utensils.

A RANGER'S PACK TRAIN IN THE MOUNTAINS IN THE SUMMER TIME



There were two ways that the men might have gone but either one meant making the circuit of several large lakes and the probability was that the camp would be at least a full day's trip had we been able to cross the lakes and much more than that under present conditions and no certainty of finding them at the end of the trip and, in that case, without food, we should have been in a bad way. I decided therefore to return by the way we had come to Lac Brochet and we reached a wood-cutter's camp there about five o'clock hungry enough to have eaten everything in the shack. It was a filthy place, about fifteen by twelve feet, with a stall for a horse across one end, a couple of bunks, one above the other, along the side, a rough table, with a few dirty dishes, in front of the only window, a pane of glass about fifteen by twenty-four inches, and a stove and bench. Being too tired to pitch a camp we spread our sleeping bags on the floor beside the horse and were soon dead to the world.

Next morning we left the stoves, snowshoes, mail and other things we had brought for the men, with the jobbers knowing that the men would send to a cache nearby for provisions before very long. Then taking our canoe we started for home, as my companion refused to undertake the trip up again and then and there resigned his job. Our trip down the Chienne river was quick until we reached the first small lake and this and the next one we found completely frozen over. It took us until three in the afternoon to break our way through these and we reached the Mattawin River about half past four and found this frozen too solidly to admit of any further canoeing.

We thereupon cached our canoe on a staging built on four trees and taking our provisions and sleeping bags started down the river for an old log camp where we had noticed a stove and some provisions on the way up. This we reached, pretty well fagged out about seven. We found that the stove we had noticed had no pipe, so turning it upside down and propping it up on four stones we made a fire and had

some supper, losing no time afterwards in getting into our bags. There was a small room off the large one with two bunks in it and my man took the upper while I spread my bag on the floor. Some time in the night I was roused by wild cries of fire, and getting out of my bag, I found that the stove had gotten red hot and set fire to the floor which was burning merrily. We soon had this out and returned to our couches. In the morning we congratulated ourselves that my man had taken the upper bunk, because the smoke had awakened him, and right beside the bunks we discovered two full boxes of dynamite.

As it was snowing heavily we spent the next morning making two small sleds out of barrel staves so that we could drag our baggage over the ice instead of carrying it. Next morning we crawled across the river, dragging with us long poles in case the ice should break and started down. I tried to persuade my companion to keep a little away from the shore where on account of the shallower water the ice was not so thick, but he would not and twice that morning we had to build a fire to dry him out. We had lunch on the end of the "Long Portage" and tried to use our snowshoes in the afternoon but the snow was very soft and sticky and my companion, being unaccustomed to them, made very slow progress. We camped that night about halfway over and were glad of the rest for trudging through a foot of snow with a pack is no fun.

By next morning we had another three inches of snow and I fairly had to drive my man out of his blankets. All day we plodded along making only about four miles. Soon after breakfast next morning we reached Lac Prudent, the end of the portage and found an old scow frozen in the ice of the small bay, but the rest of the lake as far as we could see was open. We started in to cut out the scow, which took over two hours as we had to cut a regular channel through the ice, and putting our stuff on board we went down the lake, stopping at a deserted driver's camp where there was a stove. Here we had a good supper and a good



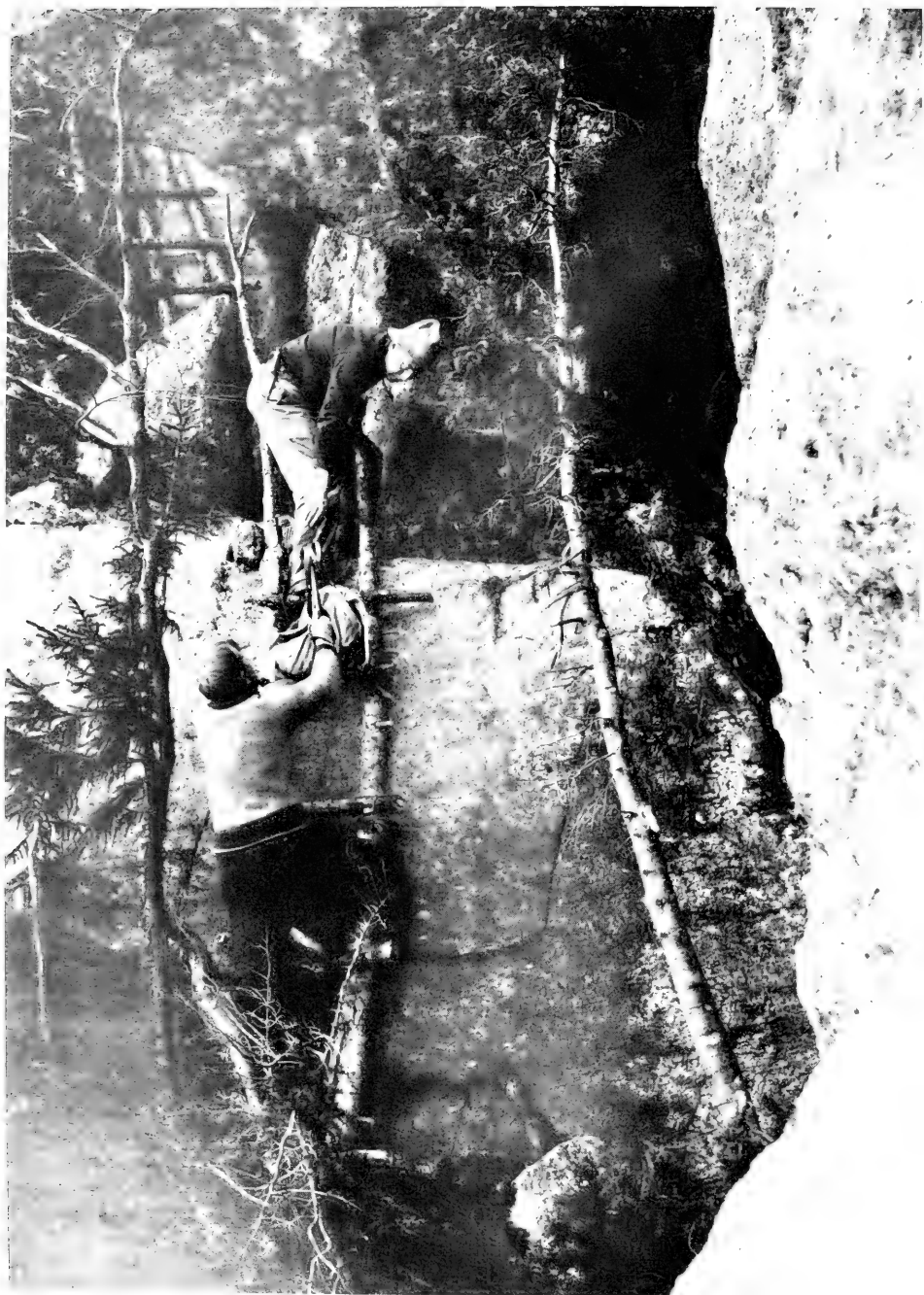
RANGER IN CANOE ON THE RIVER MATTAWIN

night's rest. In the morning we started with the scow, but the wind was so strong and our makeshift oars so inefficient that it was noon before we reached the lower bay, and finding this frozen too thickly to break we stopped for lunch.

We made a couple of light sleds for our baggage and skirting the shore, as the ice was barely thick enough to hold us, we reached the end of the lake and crossed the portage, arriving at Lac Marcotte about four thirty. This had all frozen over since we crossed it on the way up and as there was a good camp just across the bay, about three-quarters of a mile off we were anxious to reach it so that we would not have to pitch the tent. I tried the ice with a pole and finding it pretty thick cut several holes with my ax to a point about one hundred feet from shore and found it safe. Going back for my pack, I told my companion to remain about two hundred feet behind me in case anything happened and off we started.

I had gone about six hundred feet from the place where we went on to

the ice and was about three hundred feet from the nearest shore when all of a sudden without any warning the ice seemed to give way in all directions dropping me into the freezing water. I was dragging my sleeping bag on a sled and this was floating near me. I swam to the edge of the ice nearest to the shore and tried very carefully to get up on it, but it was too thin. I tried this in several places, breaking the ice in front of me toward shore in the hope of finding a place where it would bear me. I had called to my man as soon as I went in and he had gone back to shore and cut a long pole which he slid out to me. This I placed across the narrowest part of the break and got almost out on the ice when it broke again and down I went headfirst into the water. I was getting so chilled now that I could hardly swim so I made for my sleeping bag and with that to hold me up swam to the ice nearest shore. Sliding the bag under my chest I tried to work myself out on to the ice and got my whole body on it with only my feet on the bag and was just congratulating myself on my success when the



TRAIL THE FOREST RANGERS SOMETIMES HAVE TO CLIMB



A FRENCH CANADIAN JOBBER

ice gave way again and down I went. On coming up I was so numb that I took a turn of my tump line around my body in case I should lose consciousness. I did not know how I was ever going to get out and was childishly angry at not being able to, and at the thought of having to drown.

Twice my man had started out on the ice after me but I had made him go back, realizing that if he went in we should both drown. I called to him to cut a long, dry pole and to tie three tump lines to it and slide it out to me. I got hold of this and lying on my bag and breaking the ice in front of me he drew me to a point where the ice was thick enough to crawl on. By now, twenty-five minutes after my first plunge, I was very numb and to cap the climax when he came out to help me, about fifteen feet from shore we both went in again, but fortunately only up to our chests. After getting out I completely lost consciousness but he told me that I could walk and insisted on going back to the camp where we had spent the night before and he had to forcibly drag me on shore.

When I came to I was sitting naked on a log in the snow being rubbed with

a dish towel. He had some dry underwear in his duffle bag and this we put on and as I had had all the matches and they were of course wet, we gnawed a piece of hard tack and both crawled into his sleeping bag. At least half a dozen times in the night he waked me up, saying "for God's sake let me turn over."

When we woke in the morning our clothes were frozen solid and my breeches were standing up just as though there was a man inside of them. Having slept with the matches under my armpit they were quite dry and we soon had a good fire and some breakfast, although as most of the provisions were in my pack, we had to be satisfied with corn meal mush and some bacon. The night had been cold and the scene of the accident was completely frozen over and we cautiously crawled out and chopped out my sleeping bag and pack. My ax and camera with all my pictures had sunk. We crossed the bay and finding the rest of the lake open had to skirt the shore, reaching the depot about three in the afternoon none the worse for the adventure.

FOREST WASTE CAUSES FAMINE

By PRESIDENT JOHN T. PROCTER

Baptist College, Shanghai

CHINA'S life-sapping famine, in which millions are suffering, is largely traceable to the wasting of the forests. One of the most horrible tragedies of the world might have been prevented by the careful use of these resources.

"China's hills and mountains are deforested. This is particularly true in the hilly country drained by the Yangste river, whose valley comprises the stricken district. The river brings the soil down with it. That is the reason why we have the Yellow sea. For three hundred miles out from land the ocean is discolored by the silt brought down by the Yangste. The hills are washed bare of soil. There is some hunting in these hills, but the animals live among the brush. For want of better fuel the natives burn this brush.

"Last August the Yangste overflowed and flooded about 40,000 acres of densely populated territory. This flood placed a population of 3,000,000 in want. In fifty years there has not been such another flood. Some of the victims have been drowned out for two consecutive years, some three years, some four years. They not only have lost food, they have lost hope.

"Much of the land that was inundated is at sea level. It is drained by the most intricate system of canals in the world. I know of one city of 30,000 which is surrounded by canals. There are no roads to it, because a road could not go half a mile without touching a canal. There are not even footpaths. The people make their way to and from the city in boats. This is their only means of communication."

The movement for a woods products exposition in the United States is daily receiving encouragement and the outlook now is that one will be held within a short time. At such an exposition a great and varied line of manufactured lumber goods could be exhibited and an opportunity given for a very comprehensive exploitation of lumber and its manufactures.

Assistant District Forester A. C. McCain, who has been attending to matters relative to the division of the Humboldt National Forest, has returned to his station at Lamoille, Nevada.

F. N. Haines, formerly supervisor of the Blackfoot National Forest, has been endorsed for the position of Superintendent of Glacier Park, succeeding the late Major W. R. Logan, according to a dispatch from Kalispell, Mont.

The Bavarian Government has given much attention to fruit growing, a decree having been issued as early as 1769 requiring all land owners to plant fruit trees along the public highways bordering their estates. The systematic planting of such trees was begun about the middle of the last century. The value of fruit trees in Bavaria is now estimated at \$170,000,000.

FORESTRY WORK AT SOUTHERN COMMERCIAL CONGRESS

TWO forestry problems were handled at the Southern Commercial Congress recently held in Nashville. One involved the question of the management of large holdings of forest lands, and was considered at a conference with lumbermen. The other considered the farm forest and its relation to the farm and farmer. The lumbermen's conference was presided over by Mr. H. S. Graves, Forester of the U. S. Department of Agriculture. In addition to many of the largest lumbermen from some of the Southern States, there were present the State foresters of Wisconsin and New Jersey.

The dominant subject considered at the conference was the protection of forest lands, and especially of cut-over forest lands, from fire. The systems in use in several of the Northeastern and Lake States were discussed, and their applicability to Southern conditions; the cost of forest-fire protection; the relation of land owners, the local community, and the State to protection, and the distribution of the cost were all considered. It was shown that if protection could be secured, cut-over forest lands could be made a profitable investment for the production of timber. A great portion of the cut-over land is suitable for farming. It is possible, however, to produce a merchantable crop of young timber upon it before the labor conditions will permit its utilization for farming purposes.

Resolutions were adopted which called attention to the importance of the forest industries of the South. These industries, with their dependent industries, give employment to more than 400,000 men and yield annual products which amount to one billion dollars. The permanency of these industries is threatened on account of the unproductivity of the cut-over land which is largely the result of fires. The legislatures of the several Southern States

were requested to appoint legislative committees to investigate the forest conditions and problems and to confer with committees of other States relative to desirable and uniform legislation having for its object the protection of forest lands from fire, the reduction of waste, and the adoption of methods of increasing the earning capacity of forest land. It was further urged that the States should make provision both for popular and technical education of farmers and other land owners in the methods of protecting and developing their forest land.

The farm forest meeting, which was conducted under the auspices of the U. S. Forest Service, was participated in by W. W. Ashe, Forest Service; Prof. Alfred Akerman, of Athens, Ga.; and Prof. J. A. Ferguson, of Columbia, Mo.

Planting forest trees on waste farm land was discussed by Prof. Akerman. He laid special stress on the choice of a species adapted to the site and the returns which can be expected from such plantations.

The management of old timber was discussed by Prof. Ferguson. He took up the necessity for making improvement cuttings in old stands, as well as liberation cuttings and reproduction cuttings, and the great opportunity that the farmer has for carrying on such work.

W. W. Ashe discussed methods of increasing the earning value of timber lands. With fire protection assured so as to preserve the fertility of the forest soil, the greatest returns must be expected from the management of young timber. As a rule the growth of stands of old timber is slow, or the stands are even stationary. Young stands respond to thinnings by making greatly accelerated growth. These thinnings should be so made as to concentrate the vigor of the soil in a comparatively few

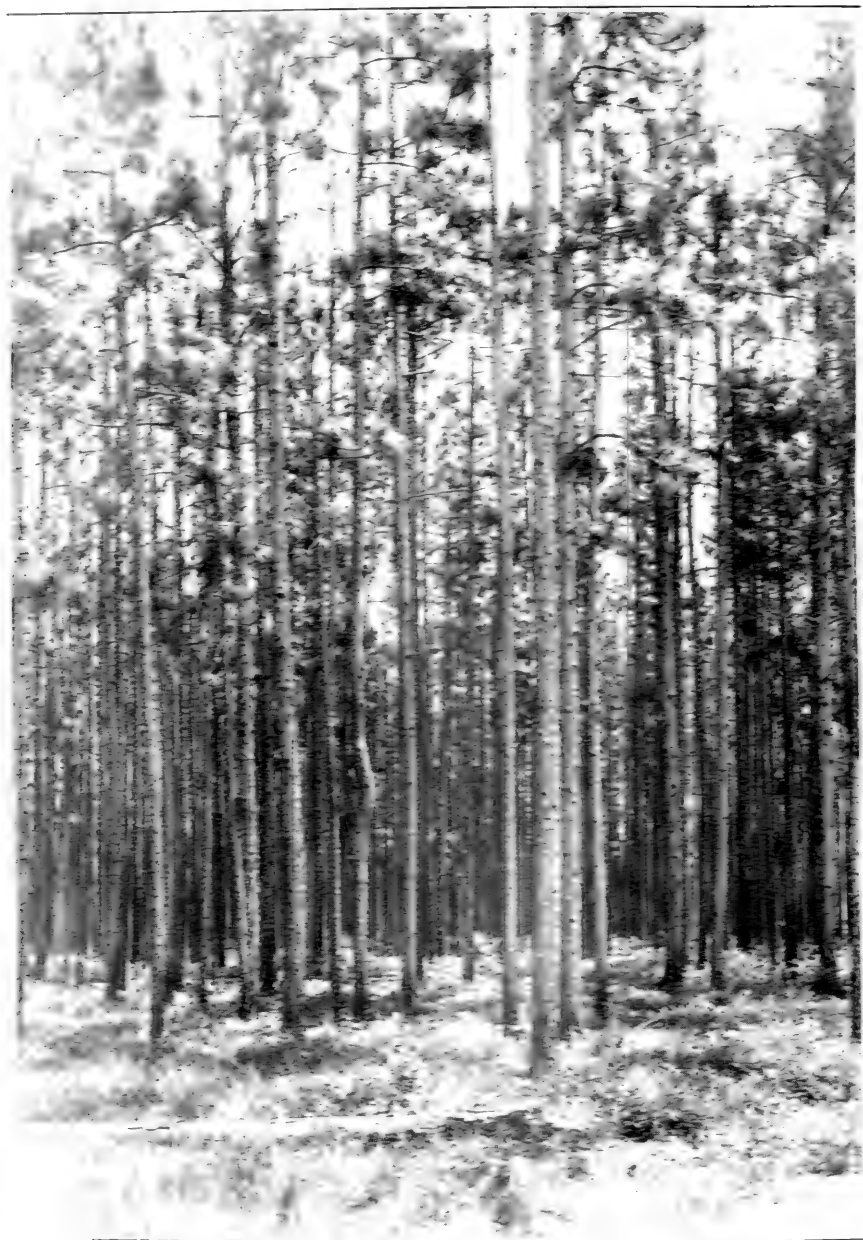


Fig. 1. Forest of tall, slender trees, likely pines or firs.



choice and thrifty trees. Such thin stands of second-growth pine, chestnut, red oaks, yellow poplar, and cottonwood will produce from 500 to 1,000 board feet of merchantable timber per acre a year. It is desirable to defer cutting young timber until the maximum yield per acre can be secured. It is equally as desirable to cut it before it has become old and its rate of growth has declined.

MR. GRAVES' ADDRESS

In opening the lumbermen's conference Mr. Graves made an address upon the problems which are to be considered in the South. He said:

"In any consideration of the industrial development of the South, the problems which stand out as most important are those connected with agriculture and forestry. We have met in this special conference to discuss forestry, a subject most intimately related in many ways to agriculture, but which is of such great importance in itself that it deserves separate consideration.

"The South is favored with climate and soil especially advantageous both for agriculture and for the production of forests. The original forest was characterized not only by trees of large size but by a great variety of species of peculiarly high quality and of value for widely diversified uses. The hardwood forests were unmatched in any land and the products of the coniferous forests now have a world-wide use.

"It is unnecessary for me to remind you of the important role played by the resources of the forest in the industrial upbuilding of the South. Suffice it to recall that the cut of lumber aggregates some 24 billion feet a year, or over half of that used in the entire nation. In addition to the lumber interests, other industries, such as the production of turpentine and rosin, the manufacture of wood pulp and paper, cooperage, tanning material, furniture, wooden ware, wagons and carriages, and the industries connected with wood distillation and wood preservation, bring the value of the products of the forests today to upwards of 550 million dollars. Louisiana stands now second in the

production of lumber, being exceeded only by the State of Washington, while Mississippi, North Carolina, Arkansas, Virginia, and Texas follow in the order named, all leading the principal Northern and Western timbered States. I am told that the lumber industry of the South employs some 217,000 persons, and that the allied industries require over 200,000 more. We are therefore dealing with a problem of gigantic proportions and one which because of its magnitude is not of local importance merely but touches the welfare of the entire nation, and calls for the nation's full recognition.

"Originally the forests of the South covered over 220 million acres. The process of clearing land for agriculture began early in our history and extended rapidly throughout many sections of the South, so that today the total forest area has been reduced to some 150 million acres. This great area comprises a large amount of land which is susceptible of agricultural development as the forest is removed. It is of vital importance to the South that the land suitable to agriculture be devoted to that purpose and just as rapidly as possible be actually used for the growing of crops. That is the problem of those promoting the development of practical and scientific agriculture. There is, however, a vast area of land, some of it in great blocks in the mountains and elsewhere, and some in small patches within the agricultural areas, which is suited only to the growth of trees. It is estimated that this aggregates some 100 million acres. The problem of forestry concerns primarily this area, which is of such a character that it should be continued in productive use for growing timber.

FORESTS AND FLOODS

"From an economic standpoint we must recognize that forests render service to the public not only through the production of timber for use and the maintenance of important industries engaged in the manufacture of these products. In the case of many forests important benefits are derived from their action in preventing erosion and



A THING OF BEAUTY AND A JOY FOREVER—IF THE HEADWATERS
ARE PROTECTED



LOGGING TULIP POPLAR IN APPALACHIAN FOREST. HAULING LOGS TO THE WATERWAY BY OXEN, NORTH CAROLINA

tending to maintain the regularity of stream flow. A great deal of confusion has been prevalent regarding these functions of the forest. Many persons point to great floods like those we are now having and insist that forests have nothing whatever to do with the control of water. This is as absurd as would be a statement that forests absolutely prevent large floods. My time does not suffice to enter on this subject in detail, but I wish to say this in regard to the influence of forests on run-off of water: There are many factors controlling run-off, of which the vegetative cover is one. Forests do exercise a powerful influence on the distribution of water after it falls, and do tend to regulate the flow of rivers. This is, however, only one factor and may be and often is entirely overbalanced by other factors like long continued rainfall or sudden thawing of snow in the mountains. The Geological Survey is developing some very important and interesting facts regarding the influence of forests on erosion in the South, which I hope may be brought out in this meeting.

"We have, then, in the South vast forest resources; they are being exploited rapidly and their products are contributing enormously to the production of wealth in many parts of the nation. Our problem touches the method of handling these great resources. Are the forests being developed in a way to benefit the South permanently?

"The bulk of what is put on the market is from timber 150 years old and upwards. That is, we are still drawing mainly on the original supply and only locally from second growth timber. In the main no effort is being made to replace the old stock as it is cut. The cutting takes place without reference to a new crop of trees and we still have that greatest enemy of the forest, fire, which not only damages standing timber to a greater extent than is commonly believed, but also kills the young timber and prevents the establishment of new growth. At present the supply of timber in the South is rapidly being diminished without replacement. Moreover, the forest fires are primarily re-

sponsible for the damage resulting from erosion and disturbance of stream-flow in the mountains. This then is the situation: That the forests will not continue to serve the South as they are now serving it and could under better conditions be made to serve it perpetually. Unless there is a correction of these conditions the supply of products will not be maintained, local industries will decline, or vanish, land values will be permanently reduced, and the bene-

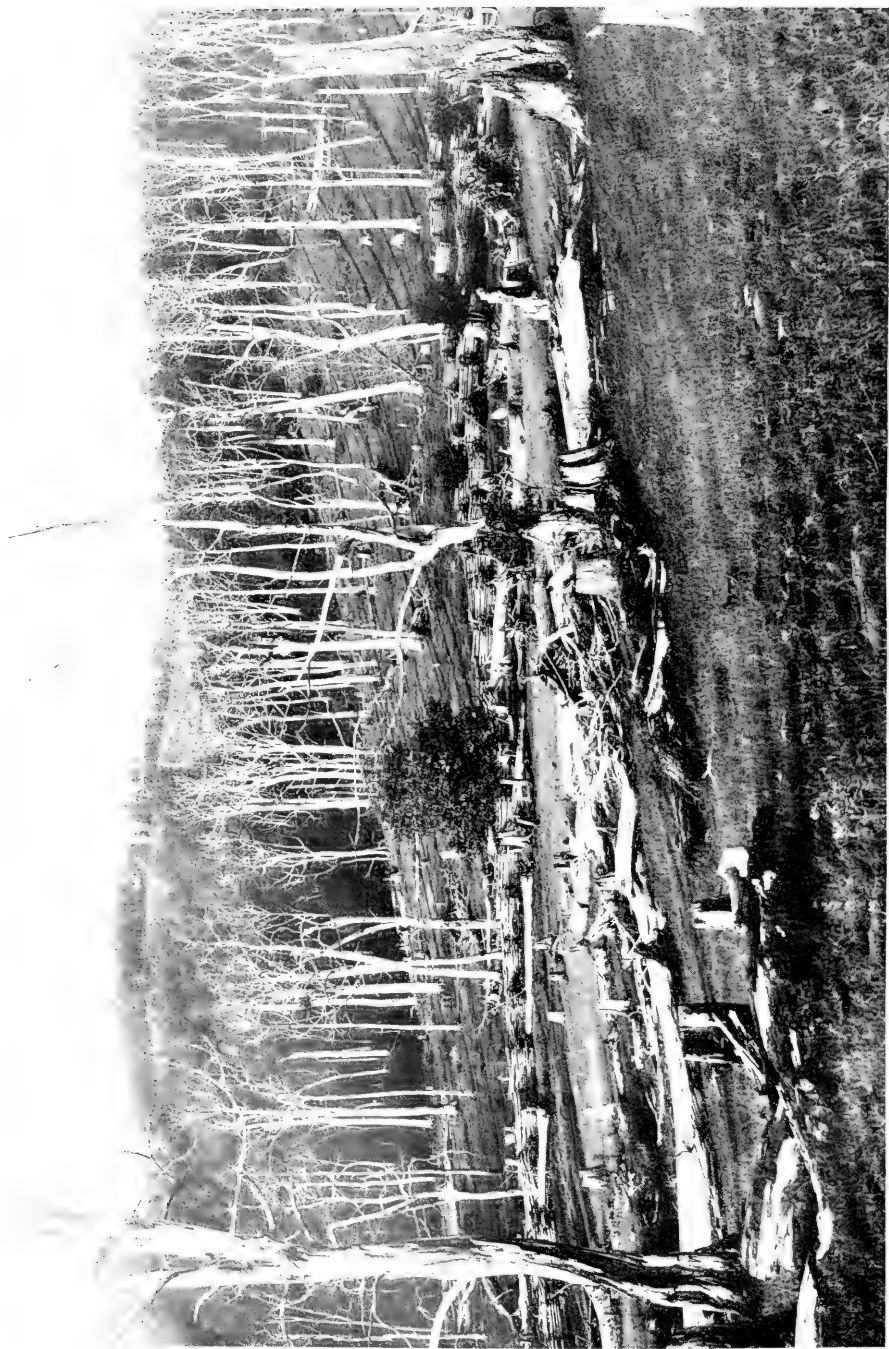


LARGE WHITE OAK IN A HOLLOW
BELOW A CLIFFWIND COVE,
JACKSON COUNTY, KY.

fits arising from the mere existence of well managed forests will be lost, with unfortunate results.

FOREST PROBLEM EASY

"On the other hand, there is an enormous area of land suited only for



"DEADENING" IN APPALACHIAN REGION, LAND CULTIVATED WITHOUT FURTHER
CLEARING. A CRUDE SYSTEM OF AGRICULTURE, EAST TENNESSEE



GATHERING CRUDE RESIN FROM WHICH TURPENTINE IS DISTILLED. CUP AND GUTTER SYSTEM, LONG LEAF PINE FOREST, FLORIDA

forest growth. The South is endowed with species which grow with great rapidity. Conditions of climate are such that natural reproduction occurs with tremendous vigor if only given a chance. There is no region except the far Northwest where forestry is so simple and the results so sure. Actual estimates show that it is entirely practical to secure from the area which should be permanently in forest fully 24 billion feet in the long run, by growth, if the forest is properly handled. Much of this area is in the mountains and the very management for timber production will secure the indirect benefits of the forest. We must definitely answer the question whether the South will continue for all time to furnish the nation with 20 to 30 billion feet of timber, with all that is meant by such a continuous production of wealth, or will give up this opportunity. I am stating no new or unfamiliar facts. Year after year we gather in different conventions and restate this problem and dwell on its importance. Year after year the problem becomes a more critical one to the country.

"To-day we come together again to discuss it in the hope that we may arrive at some definite program which will lead to positive results.

"No one appreciates better than I the practical difficulties in the way of bringing about the desired end. No one appreciates better than I that it can not be accomplished at once. I do main-

tain that it can be accomplished to the full extent of the results I have suggested, and even more. My great object is to see a beginning made which will actually lead to the final goal.

"The main difficulty has been that efforts have been scattered and individual. We should appreciate that our efforts must be organized and all agencies which can contribute to the work must be brought into effective coöperation.

"The greatest obstacle in the way of forestry is forest fires. This enemy can never be mastered except by organized effort. With the fires mastered the rest is comparatively easy. We must therefore, with all our forces, national, State, and private, endeavor to overcome the fire menace. How this is to be accomplished will be brought out at this convention. The public must aid in the matter of a uniform, consistent, and sane system of taxation which will enable the owners to foresee the changes against their enterprise in the future. Private owners must accept their responsibilities as trustees of a great natural resource and handle their property in a way which will build up and not injure the interests of the State. Just what should be done and what can be done in practice? Where shall we begin and what is the first step? This is now before this conference to discuss, and it is my confident hope that some definite, clear-cut conclusions can be reached. * * * *

In a short time W. N. Millar, superintendent of the Kaniksu National Forest of the first district, will resign to become forest inspector of the Dominion Government forestry branch

Representative Warburton, of Washington, has introduced a bill for the sale of timber on the Quinault Indian Reservation, in Washington, the proceeds to go toward the construction of a road into and through a part of the reservation.

The Senate has passed the bill already passed by the House, and fathered by Representative Pary, of Montana, authorizing the sale of burnt timber on public lands, under regulations of the Interior Department.

RAISING DEER ON FOREST PRESERVES

By PERCIVAL S. RIDSDALE

FOREST land in Maryland, which is now of not much practical use, may soon be made to return an indirect revenue as a feeding ground for domestic American elk, white tailed deer, red deer, fallow deer, roebuck or any other members of the deer family. This condition is contingent upon the passage of a bill by the Maryland State legislature authorizing the raising and selling of these deer in enclosed preserves by the owners of tracts of forest land.

The idea is to raise deer for the market, and as there is fine feeding and plenty of it on the cut over forest lands of the State, much of which may readily be enclosed with wire fences, and as the flesh is good eating and good prices may be commanded for it, there is every indication that, if the bill passes the legislature, the project will prove successful.

The plan originated with Mr. William M. Ellicott of Baltimore who has hunted big game in the United States, Mexico and Canada and who has been interested in learning of conditions in Europe where the markets are well supplied with venison and other game from private preserves and breeding establishments. He is enthusiastically in favor of the plan and is doing what he can to secure the passage of the bill.

Mr. Ellicott in talking of the proposed law said: "At first sight this seems to be a matter of only ordinary interest, but when it is realized that the deer as a wild animal has become practically extinct in Maryland and that only occasionally is venison seen in our markets, and this at almost prohibitive prices, it will be clear that a great benefit may be conferred upon the community and that an industry of commercial importance, heretofore un-

known in the State, may be established if it becomes a law.

"The deprivation of the public in the matter of venison as a part of the regular dietary is altogether unnecessary and unreasonable. While wild game should be amply protected and means provided for its propagation, it has been amply proved that a large population cannot be kept supplied from that source, and it is reasonable and proper that States where it exists should prohibit its export and sale, as is the case now in all the Eastern States.

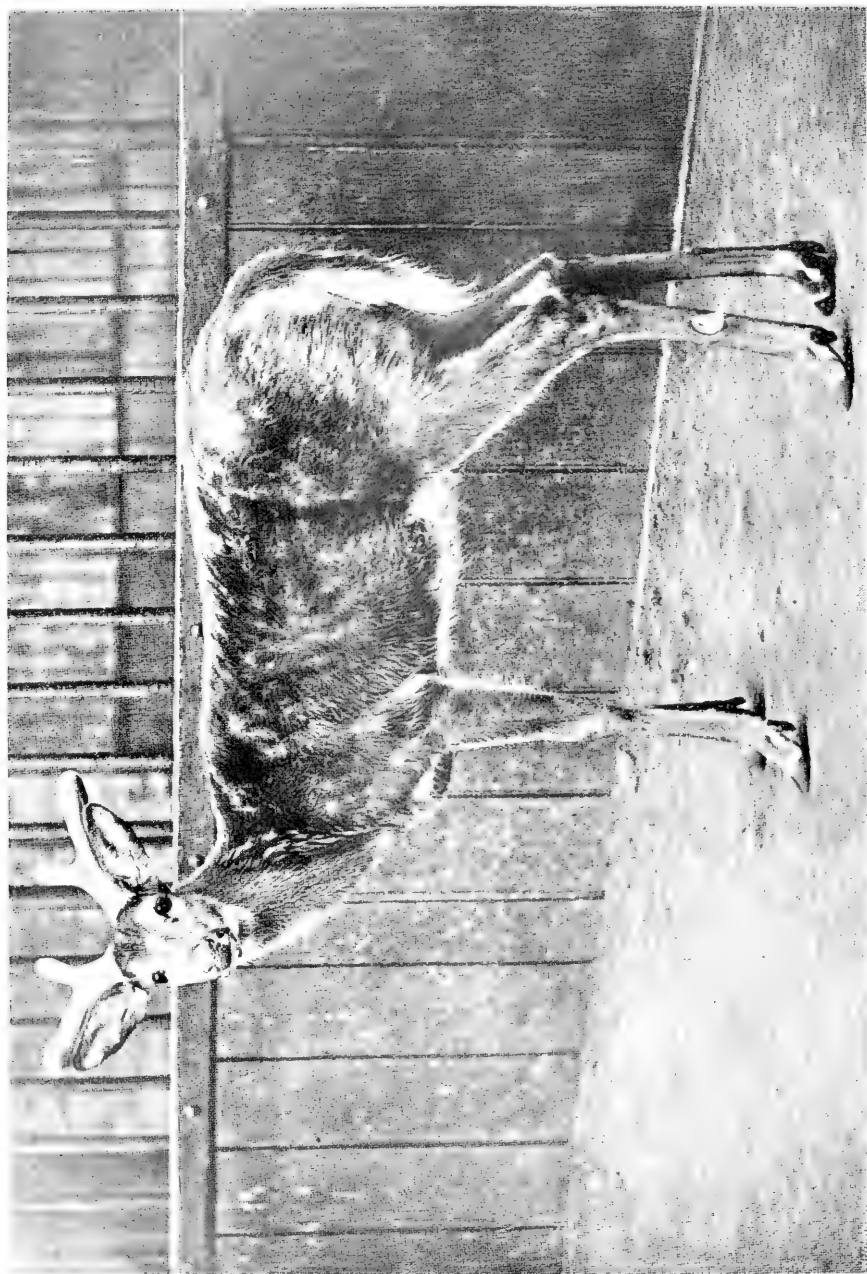
THE BUSINESS WOULD BE PROFITABLE

"The sale of game bred and maintained in inclosures from stock which has been legitimately acquired is a totally different matter and should be encouraged to the fullest extent.

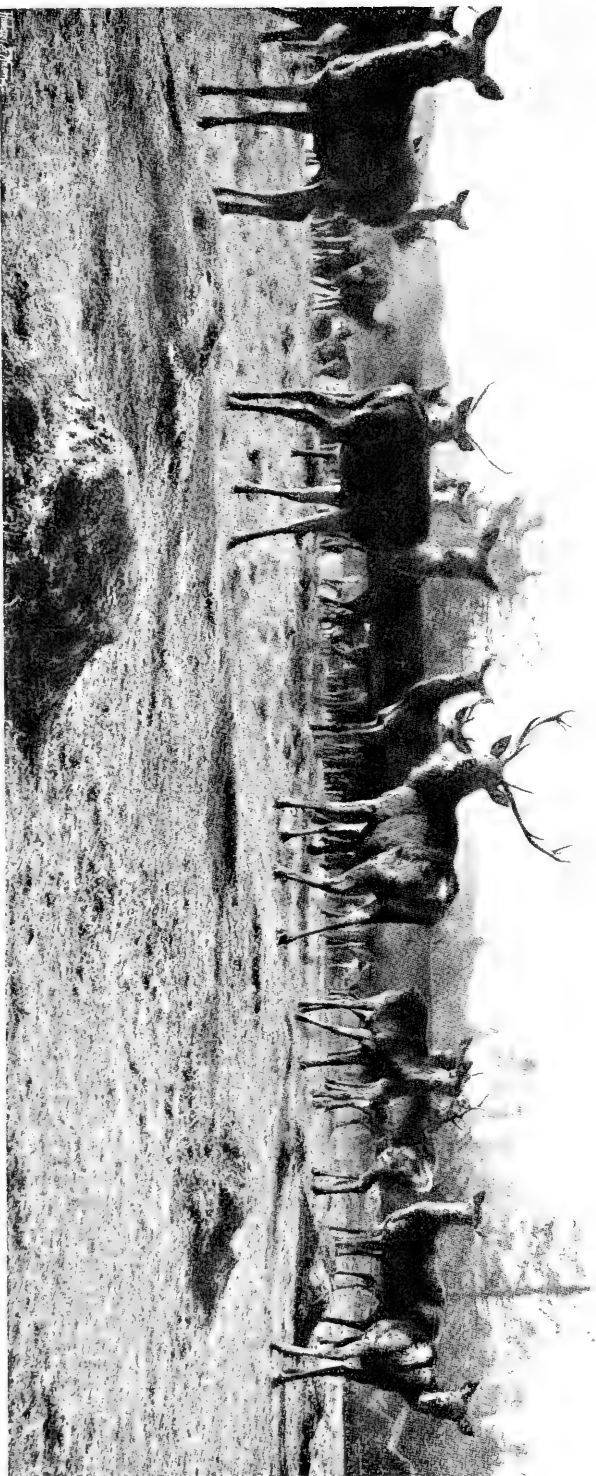
"Both official and unofficial reports go to show that several varieties of deer can be profitably raised; that they require less care and subsist upon rougher food than any of the domestic animals except the goat, and that their value for food purposes ranks with the best beef and mutton.

"Breeding stock can be had at present at very low prices—\$15 to \$25 for deer and \$20 to \$75 for elk (Wapiti) as opportunity affords. According to Farmers' Bulletin No. 330, of the United States Department of Agriculture, the most available source of supply is the surplus from private herds, zoological gardens and parks.

"The roughest waste lands with a plentiful growth of underbrush, weeds, etc., and running water are best suited to the enterprise. Deer prefer to browse on scrub growth and to eat the coarsest weeds rather than the best of hay. When pasture is limited they do well on corn, oats, wild hay and alfalfa.



A VIRGINIA DEER



A HERD OF RED DEER



to the deer, and the hunters are not allowed to kill more than one deer per season. The deer are also protected from poachers, and the hunters are not allowed to kill more than one deer per season. The deer are also protected from poachers, and the hunters are not allowed to kill more than one deer per season.

THE DEER

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ELK IN THE WIND



A MAGNIFICENT SET OF ANTLERS

"Meagre appropriations have recently been made by the State of Wyoming to feed them, but this has not proved altogether successful and there is still untold suffering and waste. It has been suggested that some of these elk should be translocated to other ranges or put on private estates where they will be cared for. I understand among the States that would like to become a source of supply of elk in this present condition are California, Oregon and practically all the States west of the Rocky Mountains."

THE ELK IN CALIFORNIA

"The California Department of Game has been very successful in this matter. There they have been able to establish preserves in the mountains where the elk are protected."

"Some of the elk have been sent to England for the purpose of breeding."

"They have been crossed with the European breeds, which has very much improved them."

"The bill provides that anyone desiring to engage in the raising or selling of domesticated American elk, white tail, red, fallow deer, roebuck or any species of deer in an inclosed preserve may do so upon receiving a license from the State Game Warden. The license fee is fixed at \$5 to be retained by the Game Warden, who upon being satisfied with the good faith of the applicant shall issue a breeder's license."

"The license, it is provided, shall give the breeder the right to raise and sell for breeding purposes all species of deer or to kill the animals at any time and to sell the carcasses for food. When the preserve is located in Washington, Alleghany or Garrett counties, the bill provides that white tail deer killed upon



THE KUDU OF THE KALAHARI

The kudu is a large antelope which is found in the Kalahari and other parts of South Africa. It is a very beautiful animal with long, spiraling horns.

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FORESTRY IN SOUTH AFRICA

CONSIDERABLE progress has been made in the development of forestry in South Africa since the first reports were published in 1900. The country is now covered with a dense forest of trees, and the people are beginning to realize the importance of the forest in their lives.

The forest is a very important part of the country's life. It provides food and shelter for the people, and it is also a source of timber and other products. The forest is also a beautiful sight to see.

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PAPER COMPANY'S FORESTRY PRACTICE

By B. A. CHANDLER

Assistant State Forester of Vermont

THE Champlain Realty Company, which is a land holding company of the International Paper Company is taking a very progressive stand in forestry in Vermont. It is carrying on three main lines of work: fire protection, nursery and planting work, and marking their timber for cutting.

The fire protection work consists of coöperation with the State in every possible way and in independent patrol work.

Their planting policy is very progressive. For the last eight or ten years the Company has been buying abandoned farms which were coming up to spruce and hardwoods. It is estimated that it has at present about 100,000 acres of open land to be planted connected with these farms. Besides there will probably be about 100 acres each year cut over where it will be impossible to get natural reproduction.

For the past three years including this coming spring, it has purchased and planted about 100,000 Norway spruce in Vermont. It maintains a nursery at Randolph, Vermont, from which it has planted about 15,000 trees yearly.

The present stock in this nursery is estimated as follows: 15,000 Norway spruce, 1 year transplants; 10,000 Norway spruce, 1 year seedlings; 10,000 Norway spruce, 1 year seedlings. The Company expects therefore in this nursery in the spring of 1914, 40,000 transplants. It will probably have 10 years before this nursery reaches its full capacity of 1,500,000.

The Company will plant 1,000,000 Norway spruce from this the 100,000 acres cut over by clear cutting, leaving 100,000 acres to be planted yearly. It is it will take about nine years to plant the 1,000,000.

and what will probably be cut clear in this time.

MARKING WORK

The policy as mapped out by the Company is to have all the timber cut in Vermont marked, using a 12" diameter limit as a guide in the marking, with the idea of cutting over this same land again in fifty years. This marking is being done under the general direction of the State forester's office.

There are two very general types of tree-growth in this region: mixed hardwoods with scattered spruce, and pure spruce. The pure spruce may be further divided into ridgetops and spruce slopes. A few sections were so heavily culled in former years that nothing can be done now but to cut clean and plant. In the more inaccessible valleys which have never been cut over, it is possible to do more. Even here, however, the lower slopes are usually covered with mixed hardwoods and scattered spruce type, where it will be impossible to get spruce reproduction until market conditions permit the cutting of the hardwoods at a profit. It has been the aim in this type to move all the trees that will make growth enough between now and the next cut to earn a good rate of interest on the money invested in them at present stumpage values. In doing this the diameter limit has been only a very rough guide. All trees below the limit which showed signs of disease, injury by porcupines, or had such poor crowns that they would never recover and make good growth, were cut. All rapid growing trees above the limit were saved. In this hardwood type the wind is not a very important factor for it occupies the lower slopes and the hardwoods protect the spruce. Although no especial attempt was made



PLATE 1. THE SPRUCE TREES HAVE BEEN SERIOUSLY INJURED BY THIS FUNGUS AND ARE IN NEED OF REMEDY.

to get spruce reproduction under the hardwoods, especially where it looks as if weather conditions would not warrant their being cut within the next fifty years, the above system has resulted in enough spruce being left to seed up the woods, and to seed up the whole area if the hardwoods should ever be cut.

DIFFICULTIES OF THE WORK

In the spruce-slope type, which is usually situated at higher elevation than the mixed hardwoods, with south-facing slope, the wind must be taken into consideration as well as the red rot and the porcupine.

The aim in this type is not only to leave the trees that will earn a good rate of interest in growth for the next fifty years but to get spruce reproduction. It is impossible to leave individual trees standing alone for the wind will blow them over. The system finally

worked out consisted of leaving groups of seed trees distributed where possible, so that no part of the clear cut area between the groups is over three or four tree heights from a group. As far as possible these groups were composed of the type of trees that were left in the mixed hardwoods and scattered spruce type.

The principal difficulty in getting this kind of work done is not with the leading men of the Company, but with the contractors, camp bosses and choppers. The bosses even tried to fool the markers on several different occasions and several of the groups of seed trees were spoiled by roads being swamped through them when the markers were not there. It was almost impossible to get the choppers to drop diseased trees which were not worth removing from the woods. In the Company's camps more effective work was done than in the contractors' camps and some of the



THE SPRUCE IN THIS GROUP ARE MARKED TO BE CUT CLEAN BECAUSE OF THE
SPLENDID SPRUCE REPRODUCTION ALREADY STARTED



A TYPICAL LUMBER CAMP OF THE INTERNATIONAL PAPER CO. IN THE GREEN MOUNTAINS

Company's bosses cooperated with the markets in every way.

These difficulties show that besides marking the timber for cutting we must reorganize our logging operations if we expect to accomplish the best results. Under the present system all the harvesting is done by poorly paid men. Even the lumber companies of the past have been right in this policy, for stumpage was not valuable enough and labor was cheap enough so that a little waste did not count.

THE NEW STYLE OF CAMP BOSS

A stumpage manager in value the stumpage in a very different class.

First. He will be a man with the forestry point of view, having as much interest in the future crop of timber as in the present cut and will know what should be left for the next crop.

Second. He will locate his roads on

definite grades with definite knowledge of what grade gets logs onto the yard—cheapest with the least wear and tear on the teams. These roads will be located as much in reference to the timber that is being left as to that which is being taken.

Third. This new type of boss will be an expert in every part of the operation, not only knowing all the old efficient methods but continually thinking out and learning from other people new and better ways of doing things. He will not be tied down by tradition or precedent.

Fourth. This man will supervise the operation of his help, making for efficiency.

Fifth. The lumber operation of the future must be run on a commercial basis and the boss must know how much a certain type of road ought to cost and if the cost for a given week runs too high, he is going to know the reason.

Of course a detail cost keeping system will be necessary.

Those of us who look forward to some such system as outlined above must realize that it cannot be put into operation at once nor will it be perfected in ten or twenty years.

The man we want must get the forestry point of view and the fundamental principles of his work in some undergraduate school or some ranger school where the course is shaped for him, and his woods training under the best woods bosses we now have. Some of the brightest young fellows in our camps today will probably make the best men, if they will get the necessary education.

HICKORY BARK BORER

By E. P. FELT

State Entomologist of New York

THE pernicious hickory bark borer has already destroyed thousands of magnificent trees in Central and Eastern New York. The inner bark of many of the affected trees contains stout, white grubs, about one-quarter of an inch long, which will develop into beetles from the last of June to the last of July. These insects, in the natural order of events, will continue their nefarious work, and numerous other trees will succumb.

It is extremely important that all infested hickories, especially those showing only particles of brown or white sawdust in the crevices of the bark and the characteristic working of the insects within, should be located and the infested bark destroyed before the end of May. Such trees are more dangerous to the welfare of adjacent living hickories than others, which may be fairly peppered with the numerous exit holes, appearing as though they had been made with No. 8 buckshot. The borings of this pest in the inner bark are very characteristic, there being longitudinal galleries 1 to 1½ inches long, about one-eighth of an inch in diameter, and with numerous fine, transverse galleries arising therefrom and gradually spreading out somewhat fan-shaped.

There is only one thing to do in the case of a serious infection, such as that indicated by dying trees or branches. All badly infested trees or portions of trees should be cut and the bark at least burned before the following June, in order to prevent the grubs from maturing and changing to beetles, which may continue the work in previously uninfested trees. It is especially desirable to locate the hickories which have died wholly or in part the last summer, because they contain living grubs. General coöperation over an extended area in the cutting out of infested trees and burning of the bark, as indicated, will do much to check this nefarious pest. It is essential to destroy the grubs in the bark by fire or by submersion in water before the date given. This does not make it impossible to utilize the timber and most of the firewood, at least.



IDEAL SPRUCE LEFT FOR SEED PRODUCTION AND GROWTH. NOTE SYMMETRICAL, THRIFTY TOP, ALSO THE OTHER SPRUCE LEFT AFTER LUMBERING BY THE INTERNATIONAL PAPER COMPANY.

NURSERY AND PLANTING TOOLS

By WM. H. MAST
Gunnison National Forest

THE stupendous problem of reforesting the immense areas of barren potential forest land within and outside our State and National Forests is causing many a student of forestry to knit his brow in deep study with the hope of discovering some successful method of rapidly clothing these vast unproductive areas with green thrifty trees.

We have two courses of action outlined for us. One is reforestation by direct seeding and the other by planting. Experiments so far indicate that success by the former will be restricted to the most favorable sites and be secured on these only when seasonal conditions are favorable. There are, however, many large areas where planting will be the only manner by which a forest cover can be secured. But planting by the best methods we now know is costly and rather slow, therefore any device tending to cheapen production of nursery stock, facilitate transportation, and make possible extensive and successful planting work will be regarded with favor. The following description of some devices which have been used advantageously may assist those who are trying for more efficient methods along these lines.

DRILL BOARD

By broadcast sowing the distribution of seed is such that the best utilization of plant food and soil moisture is secured for the seedlings, but drill sowing is especially advantageous because of the lessened injury to the root systems of the seedlings in digging, and because of the time-saving effected in taking up the seedlings. Machine seed drills are not generally satisfactory for use in coniferous nurseries.

For hand work a heavy board with cleats 1-2 to 3-4 inches wide and prop-

erly spaced is used. One for making 12 drills 3 inches apart is the best I have seen.

SEED TROUGH

For distributing seed in drills the writer has, since 1904, used a small trough. It is made of 2 six-inch boards beveled on one edge and hinged together as shown. Made in this way it balances when set in the drill. The sower can cast the seeds against one of the broad sides and as they roll to the bottom of the trough they distribute themselves very evenly. If narrow boards are used it is necessary to carry the hand directly over the trough as the seeds are dropped. This makes slower work and it is much more difficult to get an even distribution. When seedbeds are 4 feet wide or wider two men usually work on opposite sides of the bed, each scattering seed from his end to the middle of the trough.

For securing an equal amount of seed in each drill it is best to use a small measure. A paper shotgun shell which may be cut down until it holds just the desired number of seeds, is very convenient. Seed sown in drills in this manner is best covered by sifting soil over it, using an ordinary sand sieve of $\frac{1}{4}$ inch mesh.

For maintaining even moisture and heat conditions during germination leaf mold or straw is commonly used. Where these are not obtainable burlap may be spread on the beds and sprinkled frequently.

SHADING

Both high and low shade frames are in use, some nurserymen preferring the low while others prefer the high frame. A simple low shade frame devised by the writer for use at the Halsey Nur-



WOVEN SLATTING CRATES USED FOR A SHIPMENT OF FIVE THOUSAND TRANSPLANTS TO A RANGER

sery, Nebraska National Forest, is very satisfactory where protection from rodents is unnecessary. It consists of slatting in 50-foot rolls stretched over a track of 1x2's. A row of 2x2 stakes on each side of the bed supports the track 12 to 14 inches above the surface of the bed. If the bed is curbed the stakes are placed just inside the curbing and the 1x2's nailed to the inner sides of the stakes. When weeding the slatting is loosened at one end and rolled back, the track serving to steady the laborer and making it unnecessary for him to put one hand down in the bed when leaning over at work.

STORAGE

When coniferous seedlings are dug for transplanting or when transplants are taken up for field planting it sometimes becomes necessary to hold large

numbers in storage for a greater or less length of time while the planting is in progress. To do this without injury to the stock it is important that provision be made to prevent rapid transpiration lest the equilibrium in the moisture content of the plant be disturbed and its vitality seriously reduced.

Heeling-in is a common practice, but if there is not space for this in the storage house and it must be done outside the plants should be covered with a thick blanket of straw or other mulch supported on slatting a few inches above the tops of the trees. This method of covering permits a free circulation of air for the tops, but keeps them from warming up enough in the middle of the day to cause "forcing."

In 1908, when handling a very large number of coniferous seedlings at the Halsey Nursery, I found that good results could be obtained from stacking



INTERIOR OF SEEDLINGS STORAGE HOUSE, HALSEY PLANTING STATION, THOMAS COUNTY, NEBRASKA

trees in cylindrical piles, roots to the center, as shown in the accompanying illustration. In this method of piling a liberal supply of moist sphagnum between layers of roots prevents them from drying out, and the tops to the outside, occupying a circle of larger circumference than that occupied by the roots, have adequate air space and are not likely to mold or mildew. It is desirable, of course, to place these stacks in a storage shed where a moist atmosphere can be maintained and the temperature held down.

Where tall stacks are to be built shelves should be fastened to the center post about every 2 feet to prevent the pressure from becoming too great on the lower layers.

NURSERY BOXES

Where nurseries are so situated that trees can be taken up and hauled direct to the plantation the same day they are

planted and where seedlings are being dug and moved immediately to transplanting areas tight boxes 3 feet long and 2 feet wide are convenient for the temporary packing necessary. These boxes should be padded inside with burlap or with burlap over sphagnum. They should also contain several pads fastened at one end to the bottom of the box. The pads separate successive layers of trees. These boxes should be provided with handles as shown in the illustration.

SHIPPING CRATES

For railroad shipment an extremely strong, yet light shipping crate can be made by forming four boards 1x4x14 inches into a square for the ends and nailing woven slatting onto them for the sides. The center of the crate may be lined with burlap to assist the sphagnum in excluding air from the roots, while the open ends of the box allow



BROADCASTING AND SOILMENT NURSERY

free air for the tips. I first made this crate in the spring of 1908 and have found it much stronger and more satisfactory than any other crate of equal weight. This crate is quickly constructed, and when used once is usually destroyed.

As National Forest and commercial nursery shipments increase economy demands a light durable crate which, when empty, may be collapsed and returned to the nursery for further use. In meeting this demand the principle of cylindrical stacking as described for the bags may be used, as it is the only one that presents this same principle. The crate is made of 2 by 4 in. lumber, 10 ft. long, 4 ft. wide, and 2 ft. high. The ends are made of 2 by 4 in. lumber, 4 ft. wide, and 2 ft. high. The sides are made of 2 by 4 in. lumber, 2 ft. wide, and 2 ft. high. The crate is made of 2 by 4 in. lumber, 10 ft. long, 4 ft. wide, and 2 ft. high. The ends are made of 2 by 4 in. lumber, 4 ft. wide, and 2 ft. high. The sides are made of 2 by 4 in. lumber, 2 ft. wide, and 2 ft. high. The crate is made of 2 by 4 in. lumber, 10 ft. long, 4 ft. wide, and 2 ft. high. The ends are made of 2 by 4 in. lumber, 4 ft. wide, and 2 ft. high. The sides are made of 2 by 4 in. lumber, 2 ft. wide, and 2 ft. high.

The crate is made of 2 by 4 in. lumber, 10 ft. long, 4 ft. wide, and 2 ft. high. The ends are made of 2 by 4 in. lumber, 4 ft. wide, and 2 ft. high. The sides are made of 2 by 4 in. lumber, 2 ft. wide, and 2 ft. high. The crate is made of 2 by 4 in. lumber, 10 ft. long, 4 ft. wide, and 2 ft. high. The ends are made of 2 by 4 in. lumber, 4 ft. wide, and 2 ft. high. The sides are made of 2 by 4 in. lumber, 2 ft. wide, and 2 ft. high.

as soon as they were dug in the nursery. The trees were also carried in buckets containing water when planting was being done in the field. Owing to the sandy nature of the nursery soil very little of it clung to the roots when the trees were taken up, and this was removed by the water. The belief came that an effort should be made to hold as much of the soil on the roots as possible, so the practice of placing them in water was discontinued. Therefore, in 1909, before taking up the trees the beds were staked, and after digging again care was taken to keep the roots moist with sphagnum and turpentine. To keep the roots moist during the time they were in the water, the water was kept at a temperature of 50° to 60° F. During Assistant Forester Lesley's visit to the nursery, two descriptions of the planter basket, suggested, with great success.

The Lesley Planting Basket is 10 inches wide, 12 inches long, and 8 inches deep, and made of light galvanized iron having two handles as a market basket, and a short leg consisting of wire 1/2 in. in diameter



TRAIL FRAME DESIGNED AND USED IN THE MONUMENT NURSERY BY W. H. SCHRADER. THE FRAME IS SAILED IN THE SOIL FOUR TIMES A DAY AND COVERED BY A WIRE-MESH SHALE FRAME.

filled in the corners. The top is covered over a number 12 wire to give strength. For the inside of the basket several thin quilted pads are furnished. These are fastened in vertical wires at the ends and the trays are placed in layers between the quilted pads. This affords perfect protection for the lower layers while the upper layer is being used.

By continual fertilizing the physical properties of the nursery soil have been so changed that new plants may be taken up without soil clinging to their roots and firmly and by the use of the above described tray and basket are kept in excellent condition until planted.

TRANSPLANTING

Experienced nurserymen make use of two heavy wheeled implements known as "trencher" and "firmer" for running in broadleaf tree cuttings. These, of course, are used in broad level fields which are in a perfect state of tillage. They simply apply the principles of slit

The first implement runs a 4 inch wide slit or trench into which the cuttings are placed and the second firmers and packs the soil firmly against them by means of two very heavy cast iron wheels running on either side of the row at a slight angle to the vertical. The writer, in an attempt to make use of the principle of the trencher for planting smaller size trees in the Nebraska Forest where the steep hill-sides make the use of wheeled machinery practically impossible, modified the implement known as the Plant Fitter Trencher. It consists of a heavy V-shaped shoe fastened on an ordinary steel plow beam and supplied with handles similar to a wheelbarrow. The shoe is 2 1/2 inches long, 12 inches deep, and is made V-shaped by diverging plates of steel put together at the bottom and separating them 4 inches at the top. These plates are welded and drawn up into a thin sloping edge in front, the lower part of which is widened into a flat rim so. The nose draws the shoe into the soil and a small horizontal plate attached



THE PLOW WITH TRENCHER FOLLOWING

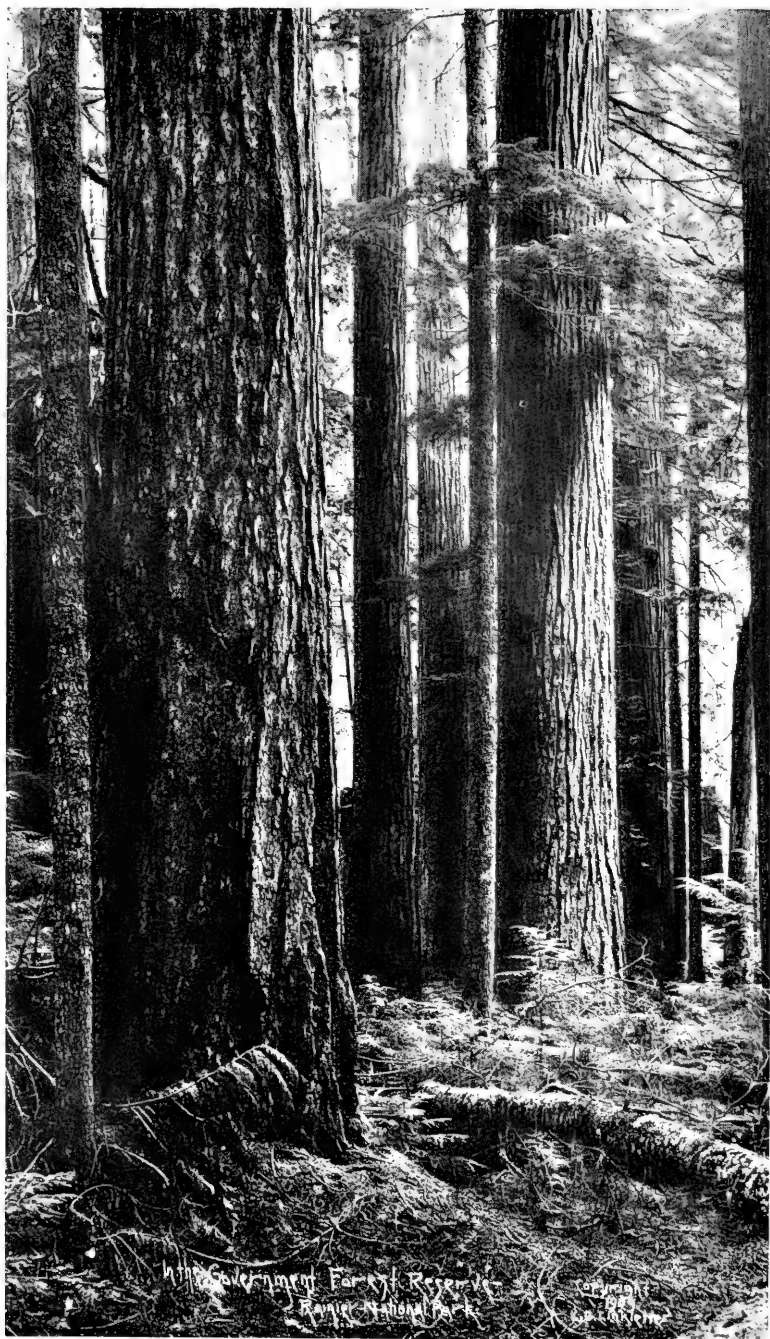
to the bottom of the shoe serves to hold it to an even depth.

With a strong slope from the nose to the top of the shoe in front, roots and trash in the soil that are not severed when the shoe strikes them are inclined to be raised above it and then slide off at one side of the beam without injuring the trench. The length of the shoe is such as to cause the sides of the trench to be sufficiently troweled to make them stand up until the planter comes along to put in the trees. The use of a short shoe results in the trench caving down and half filling in many places almost immediately after the trencher has passed.

The trencher is drawn by 3 horses and in its use in the Nebraska and Kansas Forests the trench is usually

made in a furrow turned with a side-hill or ordinary plow. A man with planting basket follows the trencher and puts trees into the trench being careful to have the roots well extended toward the bottom. As the crowns of the trees are brought to the proper height the planter sets his foot at a slight angle to the trench caving the side in against the roots. Men with long handled tampers follow setting the soil firmly against the trees and closing the trench between the trees to reduce the chance of evaporation. A gang of 10 to 15 men is required to keep up with the trencher and can plant from 12 to 20 thousand trees per day. The trencher was first used on the Nebraska Forest in 1909, and more extensively in 1910 and 1911.

F. E. Benedict, Forest Service Inspector, has resigned and will take a position in the branch of forestry of the Province of British Columbia. The first work that he will undertake will be that of organizing the forest fire patrol, after which he will help to organize other branches of the forestry department of that province.



CHARACTER OF THE FOREST ABOUT SEATTLE, NEAR THE
UNIVERSITY OF WASHINGTON

FORESTRY AT THE UNIVERSITY OF WASHINGTON

IN accordance with the diversified needs of the State the University of Washington has the Colleges of Liberal Arts, Engineering, Forestry, Pharmacy, and Mines and the School of Law. The College of Agriculture is distinct from the University and has its own governing board. The forests of Washington and the Pacific Coast generally are the most magnificent in the world. Nowhere else is the yield per acre so large nor the rate of growth in the forest as a whole so rapid. The past rapid development of the Northwest Coast region is directly attributable to its immense forest wealth.

Forestry in Washington is in many respects as important as agriculture. Up to the present the products of the forests have been more important than the products of fields, farms, and mines combined. The State of Washington ranks first of all the United States in the production of lumber. Oregon ranks ninth. Together the two states produce about 12 per cent of all the lumber manufactured in the country. In addition Washington produces more than 65 per cent of all the shingles manufactured in the country.

Because much of the land of these States is unsuited to the production either of agricultural crops or of stock, forest products will always be the basis for some of the most important industries. It has been estimated by Forest Service officials that ultimately 50 per cent of all the lumber manufactured in the country will originate in a few of the Western States. Washington has now more than 12 million acres in permanent National Forests, the State itself has several hundred thousand acres of land, much of it heavily timbered and over six million acres of forested lands are owned or controlled by lumber companies. In addition to the lands in public forests, much of the land privately owned will always be more important in the production of timber than of any other crop. It is a matter

of note that Washington and Oregon alone contain about one-third of the standing timber in the United States today.

In providing instruction in forestry the State of Washington has thus opened the way for training some of its young men to work in one of its most important fields of industry, to help solve some of the many problems the community will be called upon to solve in the future. With a distinct feeling of the need of instruction in forestry in the Northwest and particularly in Washington the College of Forestry was established in 1907.

ORGANIZATION AND CURRICULUM

The original purpose of the department was to prepare men to meet the various local needs in forestry, and to promote the interests of forestry in the State by encouraging the right use of forest resources. With the demand for men on the National Forests the energies of the School were at first directed entirely toward training men for the position of technical assistant. It was deemed possible to train men for this position in a four year undergraduate course, and this has been an entire success. However, as the technical work of this course did not differ materially from that offered in graduate schools of forestry it was considered only just to offer a master's degree to students who had already obtained a collegiate degree and wished to complete the required work in technical forestry. In that case a master's thesis is required. The work is completed in two years. At present arrangements are being made for more advanced work for this class of students. Two such courses are being offered this year.

In 1909 a special short course of twelve weeks was established for Forest Rangers and Guards desiring to increase their efficiency, or for others who wish to fit themselves for these positions. In connection with this



TIMBER PHYSICS LABORATORY, UNIVERSITY OF WASHINGTON

course it was found that there was an almost immediate demand by young lumbermen and by woodland owners for a similar class of instruction, and a modified short course to meet this demand was given for the first time in 1910. Both of these courses are working out most admirably, so much so, that it was found necessary to extend the Ranger Course over two years of twelve weeks each.

Another field which the Washington College of Forestry had in mind from the first,—that of logging engineering—is now opening up. While comparatively few lumbermen are ready to take on men strictly as foresters, they are ready to employ men who combine with their forestry training a sufficient knowledge of civil and mechanical engineering to enable them to lay out logging roads and after a term of apprenticeship to take charge of logging operations. The school is now prepared

to offer a lumberman's group designed especially to meet the needs of young men preparing to take charge of logging and milling operations, or wishing to enter upon a business career in some phase of the lumber industry.

Still another field for which the school will need to provide in order to meet the local demands, that of engineer in forest products, is just beginning to assert itself. Wood preservation and the manufacture of by-products are rapidly becoming necessary adjuncts to the saw mill. Much of the present enormous waste will lend itself to remanufacture or to the manufacture of by-products. The increasing cost of raw material is making this necessary. It is now possible to utilize at a substantial profit much of the waste which it was formerly necessary to get rid of at considerable expense.



OPEN TANK PRESERVATION PLANT

MEMBERS OF THE FACULTY

The courses in the auxiliary sciences and other subjects are presented by the faculties of the departments of the University under which the respective subjects naturally fall. In most cases it is now possible to present these subjects in courses especially arranged for forestry students. The faculty of forestry consists of Frank G. Miller, M. F. Yale, Dean; Hugo Winkenwerder, M. F. Yale, Associate Professor; E. T. Clark, M. F. Yale, Assistant Professor; Bror L. Grondal, A.B. Bethany, Graduate Assistant; Bert P. Kirkland, Yale, Supervisor Snoqualmie National Forest, Lecturer on Forest Management; O. P. M. Goss, C. E. Purdue, in charge Timber Physics; William T. Andrews, Instructor in Mensuration and Lumbering. The work given by Messrs. Kirkland, Goss and Andrews is equivalent to that ordinarily given by one instructor on full time. In addi-

tion 10 officials of District 6 of the Forest Service annually give a total of 80 lectures in their respective lines. These lectures and a course in Veterinary Science by D. W. Harrington, D.V.M., are arranged more especially to meet the needs of the Short Course Students.

The forests about Seattle give the students every opportunity for study and practice. There are magnificent forests of virgin timber and smaller areas of second growth forests, both of which are invaluable for demonstrations in silviculture and practice in cruising. Much of the timber is now being logged. This gives the student not only a chance to study the old as well as the most improved methods of logging, but also the location and construction of camps and roads; it furthermore gives him logs to scale, it gives him felled trees to make volume and growth studies; and it allows him



FORESTRY MUSEUM, UNIVERSITY OF WASHINGTON

opportunities for research work. And one of the special advantages is that the instructor can take his class from the

school building into the very heart of these forests in less than an hour by foot or by trolley.

THE EXTENSIVE GERMAN FORESTS

CONSUL GENERAL A. M. THACKARA, of Berlin, states that Germany's area of forest lands is about 34,500,000 acres, or about 27 per cent of the whole area of the country. About 11,000,000 acres of

forest lands belong to the various State governments of Germany, 5,500,000 acres are public forests; over 600,000 acres belong to Kings and Princes of various States, while 16,000,000 acres are privately owned.

J. R. McCarthy, field agent for the Chestnut Tree Blight Commission, with headquarters in Philadelphia, is now at Ridgway, Elk County, Pennsylvania, and will make his headquarters there for several months, during which he will examine the trees of the county for the fungus disease.

The American Forestry Co., of South Framingham, Mass., has just received an order for 20,000 little white pine trees, about eight inches long, from the Marlboro Water Dept. These will be set out around Lake Williams, which supplies the city with water.

FORESTS AS AN INVESTMENT

By HON. SIMEON E. BALDWIN
Governor of Connecticut

I WISH Arbor Day could be the occasion of considering anew the importance of forestry to the business interests of Connecticut, and what can be done towards multiplying our woodlots in the smaller towns. We need more forestation for two objects—to study and preserve the natural flow of our streams and rivers and to raise wood to sell. There are, our State Forester tells us, 1,000,000 acres of land in this State fit for nothing but forestation. You can use them for pasturage, but they do not produce enough in that way to make grazing pay. But if judiciously planted, they can grow profitable crops of timber and wood pulp for paper making.

Crops that are fit to market only after a growth of 25 or 50 years are not so attractive at first sight as crops that are gathered every year. Forestation can be so conducted as to yield annual crops, but it is not so conducted in Connecticut now. We have a Forest School at Yale, where they teach the business to others. We have some State woodlots, State owned, which we are trying to bring into that condition eventually. It is the thing for us to aim at.

But it is not a bad proposition to practice forestry even on the old plan of felling the timber only after a long period of years and then cutting it off clean. Brush land comes cheap, and if it does take long years to cover it with trees worth cutting for lumber, not much capital is thus left inactive, and not much care is necessary yearly, except at times that otherwise there would be nothing in the way of profitable employment in farming to occupy. Trees can be thinned out in winter and any time on off days. It is a good way of making up money. Trees grow while we sleep. They grow faster than money in the savings bank, and there is no danger of defalcation or experiments in high finance.

Let the hills along the upper Housatonic valley become more and more



HON. SIMEON E. BALDWIN, GOVERNOR
OF CONNECTICUT

barren and more and more of their top soil will run down every year until it is all gone, and the even flow that is natural to the forest-fed river gives to a succession of freshets and nothing between them. Remember, gentlemen, that in our manufacturing and mercantile establishments, with their call for packing boxes; our railroad industries, our building operations, large and small, Connecticut offers to her landholders a nearby and constant market for all the lumber they can produce. Here is the land, 1,000,000 acres, fit for this, and fit for nothing else. Here is the power in 1,000,000 population capable of turning it at small cost into profitable forests. Here is the market, right at hand, always with a short haul.

IMPROVING FOREST FIRE PROTECTION

By M. B. PRATT

WINTER is the time largely devoted on National Forests to plans for the coming field season. The danger from fire past, the character of the duties of the Supervisor and Deputy Supervisor change from active, aggressive work in the field to a comparatively quiet, thoughtful time in the office. Relieved from the constant fire suspense, and his ears no longer continually tortured with the jangling telephone bell announcing fresh sorrows, the Supervisor can now think a few consecutive thoughts on one subject. The question of protection is naturally the most vital one. He reviews the past season's fire record in his mind, and in the light of added experience, dispassionately sees things that should have been done and things that it were better to have left undone. This may lead him to call a meeting of the ranger force to help him get down to essentials.

In a meeting recently held at Nevada City, the headquarters of the Tahoe National Forest, protective measures were discussed at length. Fire working plans had been made for the past season for each district by the office in conjunction with the district rangers, and one of the objects of the meeting was to find out how they could be improved upon. It was the general opinion that the plans were all right as far as they went, but that it would be much better for each district ranger to prepare his own plan, giving his idea of what he considered ideal protection for his district, regardless of cost.

In accordance with this idea a letter was sent out from the Supervisor's office to the district rangers asking them to submit ideal plans for their districts extending over a period of years. Attention was called to the circular written by District Forester Du Bois, entitled "National Forest Fire Protective Plans" in this connection.

It was expressly stated that all views more efficient protection. The total area no matter how visionary in character, would be welcomed, since what might seem a vision now might be a reality in a short time, if the changes which have taken place the past few years are to be taken as a guide. It was further requested that each man submit a map illustrating his plan.

An outline accompanied the letter to serve as a guide in making the ideal plans. This asked for a brief history of past season's fires in each district; that all hazards such as railroads, saw-mills, summer camps, stockmen, mines and towns, should be considered, especially old slashings; that improvements needed for ideal communication throughout the districts be specified; that the organization of patrols be described in detail; that the probable co-operation in fire fighting should be stated and that the cost of an ideal plan be named.

At the time set, ideal plans for the seven districts in the Forest were in the Supervisor's office. The task then was to mill them over and evolve a secondary fire working plan for the season, correlating as much as possible the administrative with the protective needs of the Forest.

A RETROSPECTIVE VIEW

In order to obtain a proper comprehension of what is being sought, the first step in the formation of a secondary plan is to look back over the past season's record. Using the areas burned over as a basis, it follows that the working plan for the season will be made to protect these localities and others similarly situated. The summary which follows served to get the plan under headway this winter:

"The area burned over on the Tahoe National Forest in 1911 was much less than the previous season due in part

to a more favorable season, but chiefly to the plans worked out in advance for of private and public land burned over was 3,900 acres as compared with 17,000 acres last year. Last year approximately thirty-five million feet of timber was destroyed valued at \$70,000, this year 750,000 feet valued at \$1,500. Last year 1.3 per cent of the total area of the Forest was burned over, this year .003 per cent. Our total number of fires this season was 69 as compared to 77 last season. Although we did not succeed in materially reducing the number of fires by more efficient protection yet we did succeed in greatly reducing the area covered and consequent damage.

"We have learned that there is a zone of special fire danger on the west slope of the Sierra Nevadas which must be under constant surveillance during the fire season. In this zone fire spreads with great rapidity and rapid action is imperative. The portion of the Forest on the east slope does not cause so much concern. It is believed that the protective system now in force there needs very little adjustment to make it ideal in character. The plan, therefore, deals chiefly with the requirements in the special fire zone on the west slope which reaches to an elevation of about 5,500 feet. It is here that we want to spend the most of our money the coming season."

TABULATION OF DANGER SPOTS

Having taken a general survey of the situation it is next necessary to get down to details and locate the danger spots by districts. The ideal plans, of course, are very explicit in this regard. The secondary plan needs to be specific only as far as it is necessary to bring out spots for which protective measures must be devised.

First consideration is given to the areas traversed by railroads and traction engines. For instance it is noted that the Southern Pacific Railroad crosses the Forest from east to west and that trouble in the past has been experienced from fires along the right of way. The snow sheds on the west

side of the summit of the Sierra Nevada Mountains are commanded by a railroad lookout man who could cooperate with Forest officials by reporting fires outside the railroad right of way.

It is noted in another district that tractions operated by a certain lumber company started three large fires the past season and caused the Forest Service considerable expense to keep them outside the Forest.

Sawmills are located by districts and the observation made that the mills in the districts on the west slope where danger from fire is the greatest, are small. Consequently, on account of frequent loose methods of operation, they are greater danger spots.

Construction and wood camps are recorded as well as the localities where greatest hazards exist from mines and settlers. Special emphasis is placed upon certain settlements as being the strongholds of "light burning" enthusiasts. Occasionally the areas were prepared for burning, but very often fires were set by settlers in brushy areas with little regard to the consequences. One culprit became so bold that he entered the ranger's camp who was trying to apprehend him and stole his provisions.

Under this head planting and experimental areas as well as localities containing heavy stands of government timber are considered. The greatest attention is paid to the location of old slashings which are considered to require the most intensive protection. This is especially true when they are located on the west slope within the fire danger zone before mentioned.

The relative importance of these danger areas is determined in the light of what happened the past season and is kept in mind continually until the method of control is finally worked out. To assist in this matter a large map is kept in the office on which is recorded by years all Class C fires since the Forest was established, as well as the slashings and chief danger spots. At the end of the fire season each year this map receives fresh ornamentation. It affords much food for reflection, besides serving as a source of inspiration.

DETERMINATION OF NEEDED IMPROVEMENTS

The relative danger of hazards being fixed in mind the next step is to determine how to spend the improvement allotment to secure maximum protection. A primary consideration is the extension of the telephone system already in existence. The ideal plan aims to secure such a method of telephone communication that every district can be readily reached from the main office, from the lookout points, and adjoining rangers and patrolmen. Consequently, it is a foregone conclusion that a good slice of the improvement allotment will be spent in this way each year until this result is achieved. For instance, it was recognized at the close of last season that the Foresthill district required better communication. The secondary plan accordingly summed up the matter in this way: "A telephone line is needed from Foresthill to Sugar Pine and Tadpole Ranger Stations, at least, and if possible to Robertson Flat and French Meadows. The total length of this line will be 39 miles. The idea of building this line is to prevent a recurrence of the disastrous fires of last summer, if possible, by getting quick communication with all available help."

Lookout towers are important factors to be considered in the protection scheme and wherever established they must be connected with the region they control by telephone lines. The Banner Lookout Tower near Nevada City was erected the spring of 1911 and demonstrated its usefulness in locating fires in a region which had fires in one locality when the patrolman was in another. Where it is demonstrated in an ideal plan that the riding patrol has a proposition of this kind to deal with, a stationary patrol, otherwise called a lookout man, is invaluable. This man acts in conjunction with the riding patrolman and an added precaution is thus given to areas particularly infested with slashings and light burning enthusiasts.

Trails next claim the attention as a subsidiary means of protection. The

ideal plans give a large number of trails that should be constructed or brushed, and the direct bearing of this work on protection must be considered. The secondary plan picks out the ones which fit in best with the whole protective scheme. If it is seen that a trail can be constructed that will save the ranger several hours' ride in getting to an especially bad danger spot this piece of work will be considered before a trail which is recommended as a convenience to stockmen and tourists.

Cabins, barns and pastures must be provided at strategic points to serve as centres of the telephone and trail systems. The nature and cost of the houses to be built will depend upon whether they will be used as headquarters the year round or as stopping places for fire guards. The ideal plans are carefully scrutinized for all improvements needed to supplement the force which it is estimated can be put on the coming fire season. The direct or indirect bearing of every piece of proposed improvement on the whole scheme of protection is considered. The estimate of cost of each project is given in the ideal plans as well as the order in which the ranger considers it should be undertaken. The matter of improvements is directly correlated with the plans for the organization of patrol.

ORGANIZATION OF PATROL

The final decision on this extremely important part of the protective scheme can not be reached until the ideal plans have been gone over with a fine toothed comb. The ideal plans are more or less impracticable in some instances through the placing of undue emphasis on the protection of comparatively worthless areas, but the secondary plan must get down to bed rock and consider what is really worth intensive protection. A fire in the rocks and brush may be stubborn and cover considerable area but it will not do a fraction of the damage to the resources of the Forest that a small fire will do in a heavy stand of second growth pine or on a planting or experimental area which it has cost a lot of money to establish and

on which we are depending for data to shape future policy.

One ranger this year estimated that he needed eleven men, an automobile, six horses and a wagon to secure ideal protection in his district. This is very interesting and proves the ranger is a progressive, but necessity forbids that his ideas be incorporated at this time in a secondary fire-working plan. The estimate must be narrowed down to a practical basis and all Utopian schemes eliminated first of all. The process of reasoning as regards the number of men that can be employed is similar to that applied in figuring on the number of improvement projects that can be undertaken. Attention is given to the efficiency with which each particular district was guarded last year on the basis of its fire record. A tentative assignment of men on paper is then made over the entire Forest based on the fire hazards and facilities for co-operation. After this is done the sifting process of men between districts goes on until it reaches a point where it is considered that the best disposal of the funds available has been made. The Supervisor then correspondingly readjusts his estimate on improvements to fit the patrol organization.

The secondary plan next proceeds to outline the routes of patrol in each district in accordance with the number of men that can be assigned to that district. The station of each man is given as well as the route he will be expected to cover. The details of this matter are not considered in the plan, but are left to the judgment of the district ranger who is picked for his position on account of his administrative ability. His chief instructions are to the effect

that he arrange to have some one available at the telephone during the fire season in case the Supervisor's office wants to get into quick communication with the district. He is, of course, expected to take charge of all serious fires in his district, but most of the patrol work will be done by his assistants.

After the Supervisor has gotten the matter of men and improvements sifted down to what he considers the last analysis he still finds that he is going to have parts of his Forest more or less unprotected. This prompts him to seek cooperation among the various interests on the Forest, and he closes his fire plan by urging the rangers to work along this line and organize fire brigades in different parts of their districts as well as make arrangements for having supplies on hand in emergency cases.

Having threshed out the ideal plans and embodied all that he thinks will work during the coming season in his secondary fire plan, the Supervisor sends it down to the District Forester with an itemized cost sheet. If he is lucky, he may get what he asks for, but the chances are that he must be content with less and that his fire plan will have to undergo further readjustment. He has it in such a shape, however, that he can easily make the necessary changes.

By this time the fire season has opened and with his fingers on the pawns he plays many games of chess all summer in his efforts to checkmate his grim adversary which, like its crafty master Mephistopheles, is fond of appearing unawares and in different guises to the innocent.

An educational effort is being made through the forestry department of the University of Georgia to increase the timber supply of the South by reforestation. The department points out that cherry among other trees admirably adapted to the soils of the Appalachians; that the black walnut grows readily on the Cumberland plateau, and that other trees find particular areas of the South exactly suited to their growth. The Georgia department of agriculture is also interested in the subject of reforestation.

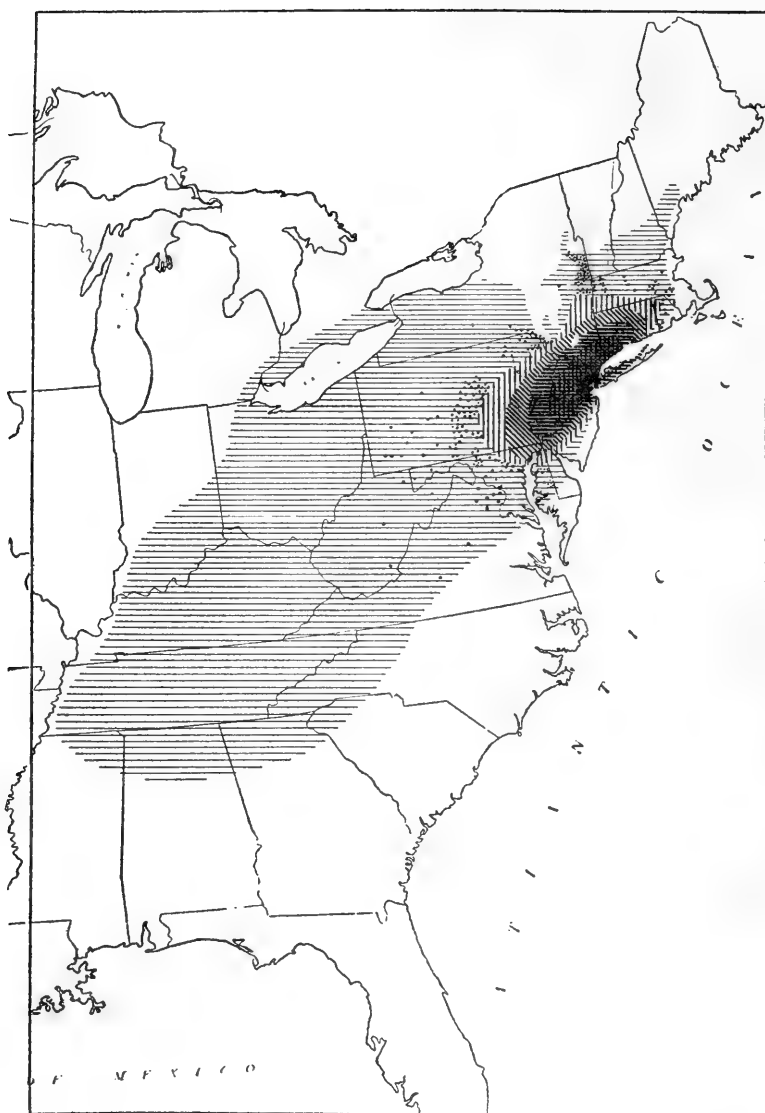
A FAMOUS OLD TREE

THE vitality and tenacity of life in a tree are remarkable. A tree will endure almost any sort of treatment. Its life is endangered only by the destruction of the heartwood. So long as the vital fluid, the sap, is able to circulate through the tree, it is vigorous.

A notable instance of this is the famous Liberty Tulip Poplar, which stands on the campus of St. John's College, Annapolis, in front of the main building. Through the agency of Dr. Fell, the President, who is an authority on many scientific subjects this tree was "doctored." This Tulip-Poplar first met with severe treatment when, in 1840, some iniquitous boys placed gunpowder in the hollow trunk of the tree. The powder exploded. Immediately the tree was ablaze. A throng of citizens rushed to the scene and deluged it with water. The explosion was not so disastrous to the tree as was first expected—rather a benefit, for it destroyed the germs which were propagating in the fungus. There was a new lease of life. The following spring showed an abundance of foliage on the branches. In 1860, a second wound was made by the falling of an old branch. This was during the Civil War when the Union men were encamped on the College Campus. It fell between two tents without loss of life or injury to anyone.

Through artificial means, the usefulness of the tree has been prolonged by giving it support to make it rigid. This support has been given through filling the tree with fifty tons of cement. The base was made broader than the upper part. Iron rods were run through the cement and these bind the parts together. Into the huge branches, which were hollow, iron rods were also run. Cement was inserted here as in the

trunk. This inner filling gives strength and enables the tree to sustain itself. There is no strain whatever on the tree. The idea of the cement is to make an air and water-tight plug, which prevents growth of fungus. The fungus growth, which destroyed the heart of the old tree, was thus eliminated. This tree, two feet from the ground, measures twenty-nine feet and four inches in circumference. It stands about one hundred and fifty-one feet high. Although the trunk is a mere shell, the tree seems to flourish, having thousands of blossoms on the branches every year. This wonderful tree stands preeminent among all others as a symbol of constancy, perpetuating beauty and victory. It is pictured on the canvas of the past as rich in memories. It stands as a tower of strength at the post of duty. The Red Men gathered under its green canopy of spreading branches for council. Beneath it they sat to smoke the pipe of peace or listen to the words of the chief, who with dignified countenance and calm demeanor impressed his tribe with wonderful authority. At length, he told them of a treaty to be made with the Pale Faces from the far-off land across the Great Water. They little realized that in signing away their rights, they were permitting a new nation to take root and that no longer would they be permitted to commune beneath those stately branches. History records the particulars of an assembly of advocates of freedom among the colonists under this noted tree. There they discussed the cause and their attitude toward the men not in sympathy with the movement—whether they should be punished or not. In 1825, a prominent personage, conspicuous in history, General La Fayette, was entertained at Annapolis under this tree.



THE DISTRIBUTION OF THE CHESTNUT BARK DISEASE *From Science*

NOTES ON GERMAN FORESTRY

By PROF. W. R. LAZENBY

A RARE opportunity to observe the forests, and to learn something of the German forest policy prompts me to write a few things concerning the German forests and their forest policy, which may be of interest to the forestry men of the United States. In the first place it should be understood that the German Empire in its federal capacity has nothing whatever to do with the forests. The control of the forests is exclusively in the hands of the various states, who in their confederation form what we know as the nation called Germany. Each state government directs the forestry policy of its own state and the national government has never interfered in any way with this procedure. We should not forget that the relation between the German states and the German Empire is exactly the same or analogous to the relation existing between our American states and our Union. In our country, however, the federal government has done much more to develop forestry than has so far been done by any of the state governments or state activity.

The first general forestry movement began about 1750. At this time the population began rapidly to increase, most of the agricultural land had been cleared of timber, there was no coal, and no means of transportation of wood from the mountain forests. A succession of winters unusually severe caused much discomfort and suffering, and the people awoke to the importance of a fuel famine.

RAPID FORESTRY DEVELOPMENT

From this time forestry developed with great rapidity. Everybody was interested because everyone needed fuel. Within the next 25 years most of the leading state governments had formulated some forest policy, the principal features being an effort to secure a continuously substantial yield of

wood and timber from all state forests. That is, no more wood should be cut than was produced in the same year; or in other words only the annual increment should be cut. After a time and with the advent of better means of transportation, the fear of a wood famine passed away, but the idea and practice of conservative forestry had taken such a deep hold upon the public mind that the development of a sane and rational forestry policy met with little or no opposition.

It is well known that trees, especially of the evergreen class, can be grown on soil that is too poor for agriculture, and the artificially planted forests on either rocky or on poor barren sandy lands that were unfit for remunerative farming. Each German state has three classes of forests. First those owned by the states themselves; second those owned by the cities or small communities; third those owned by private individuals. Most of the communal and private forests are regulated by the state, that is to some degree at least. One of the important restrictions is that no private owner or community can cut more than is produced and that all deforested land must be reforested.

One of the largest state forests is that of the Spessart mountains in Bavaria. This forest is composed very largely of white oak, which is said to be the finest in the world. Owing to its slow growth it is very fine and even in texture and yields veneer logs for which extravagant prices are paid. The average price of first class logs in the woods, many miles from the railway is something over \$250 per thousand board feet. While the choicest logs sell for more than double this price. Not a few of these old oaks have a value exceeding \$1000 each and they are only cut when it is evident that they have attained their highest value. The white oak of this district is as famous

throughout Europe as the white oak is famous in America.

EASY METHOD OF PLANTING

The city forests of Darmstadt in Hessen are composed largely of pine and beech. The oldest stands of pine were started over 100 years ago, by simply scattering pine cones upon the ground and driving large flocks of sheep over them. By this means the seed were pressed into the ground and a fair stand of seedlings resulted by using this cheap and easy method.

Especially fine are the stands of pine in the pole stage, that is of size fit for telegraph poles. These trees are 50 years old and were raised from more carefully planted seeds. They have long, clean, straight trunks, and the largest specimens are being removed so as to give a better chance to those that are left.

The youngest stands are for the most part transplanted seedlings, which were planted at the rate from ten to fifteen thousand per acre. The cost of planting is not a great item for the two-year-old seedlings can be raised at an expense of from ten to twenty cents a thousand and the labor of outplanting is from fifty to seventy-five cents a day.

The German forest policy aims to reforest all waste lands, and to gradually increase the forest area, under direct state control. It aims to improve the education and training of foresters and rangers at the expense of the state, and is seeking to extend fire and other

forms of protection over all forest land. Another feature is to encourage the largest public use of all forests as a means of health, recreation and enjoyment for all the people.

Native American evergreens and softwoods are being planted here on a large scale. Among them the white pine and Douglas fir are the favorites on the better soils, while pitch pine and Jack pines are planted on the poor, sandy soils. Last summer was one of unprecedented heat and drouth and this caused the death of many young stands of introduced species, while the natives suffered comparatively slight losses, and this emphasizes the greater vitality of the latter.

Among the introduced deciduous trees the American red oak seems to be the one that is favorably regarded.

The financial success of German forestry depends mainly on two factors: First, good means of transportation; and second, that the owners, whether they be state, city or private, refuse absolutely to sell more than a small annual percentage of the stand. By doing this the market is never overstocked, for the demand is always greater than the supply, and the price received is much greater than the cost of production, including the interest on the money invested at compound rates.

The American foresters and timberland owners can learn many things from the German foresters along many lines, and many mistakes that might be made in their work can be avoided by the study of the European methods.

The state forests of Bavaria comprise 2,150,000 acres. Thirty-three per cent of the entire area of the country is covered with forest. Of these trees 77 per cent. are coniferous. The average estimated value of the forest land is \$50 per acre. The annual aggregate expense of administering the forests, including salaries of officials, wages of workingmen, local taxation, new purchases, etc., amounts to \$1,965,204. The total revenue from the forests the same year amounted to \$8,187,349.

A NATIONAL EXPOSITION ON CONSERVATION

AN exposition of national scope, the purpose of which is to promote the conservation of our natural resources, is to open in Knoxville, Tennessee, in September, 1913. It is to be known as The National Conservation Exposition, and while it is to be open to all parts of the country, its special field will be the development of the Southern States. An Advisory Board of leaders in the various branches of conservation work, with Gifford Pinchot at its head, has been formed as part of the Exposition Company's organization, and is now at work formulating detailed plans for the exhibits. Each department of Conservation is represented on this board by one or more experts in that line.

The members of the board and the particular work assigned to each are as follows: Gifford Pinchot, President of the National Conservation Association, Chairman of the board and in charge of general conservation and forestry; Don Carlos Ellis, Secretary of the board, forest conservation; J. A. Holmes, Director of the Bureau of Mines, conservation of minerals and the protection of human life in mining operations; Bradford Knapp, in charge of the Farmers' Cooperative Demonstration Work of the Department of Agriculture, scientific agriculture and the conservation of soils; W. J. McGee, Soil Water Expert of the Bureau of Soils, Department of Agriculture, conservation of soils; Logan W. Page, Director, Office of Public Roads, good roads; Joseph E. Ransdell, Representative and Senator-elect from Louisiana, the development of waterways; P. P. Claxton, U. S. Commissioner of Education, the work of education; Dr. Harvey W. Wiley, former chief chemist of the United States, the conservation of public health; Senator Duncan U. Fletcher of Florida, President of the Southern Commercial Congress, southern development; Senator Luke Lea, of Tennessee, general conservation.

Two other members are to be added

to the board to represent country life improvement, domestic economy, and child welfare.

An exposition company has been organized and drafts have been made of a charter for a capital stock of one million dollars. The company has taken over the plant and all property of the Appalachian Exposition, which has been held at Knoxville for the two past years. This plant contains a park of one hundred acres, two artificial lakes and several excellent exposition buildings, among which is a Forestry and Mineral Building. A Southern States Building is to be erected to contain exhibits from all the Southern States which participate. An Agricultural and Land Building is also among the new structures planned. A special feature of this building will be an immense bas-relief map of the Southeast, 200 feet long, upon which the principal resources of the States represented will be displayed. As an annex to this building, will be a long auditorium for assemblies, such as the National Conservation Congress, the National Breeders' Association, and Good Roads and Waterway Improvement Conventions.

Knoxville was awarded the location of the exposition because of its splendid location in the midst of the Southern Appalachian Region and in the midst of a very rich section of the South, and because of its preparedness in having the Appalachian Exposition Plant.

The officers of the exposition are: President, William S. Shields, president of the City National Bank of Knoxville; first vice-president, J. Allen Smith, president of the Knoxville City Mills; second vice-president, Don Carlos Ellis; third vice-president, George W. Callahan, president of the Callahan Construction Company; fourth vice-president, H. M. Johnston, president of the Union Bank of Knoxville; treasurer, S. V. Carter, cashier, East Tennessee National Bank; general manager, W. M. Goodman, secretary, Knoxville Commercial Club.

OPPOSE STATE CONTROL OF FORESTS

MEMBERS of the Colorado State Forestry Association, of which W. G. M. Stone is the president, are vigorously combating a move to turn over to the State the public domain and all its natural resources. Such a change would embrace the forest reserves and if these passed into private ownership, as some desire, it would unquestionably lead to conditions involving the extermination of the forests which conserve the snows and moisture at the headwaters of the state's mountain streams.

The Association now declares that whatever changes in the Land laws may be necessary in other directions, that it most earnestly protests against the turning over to the state of that portion of the public domain which includes the forest reserves.

The Association says: "To turn the forests over to the state; for the state to open them up to indiscriminate and easy entry; letting in sawmills, tie cutters, and others in countless numbers, to get the forest products on the market; the building of thousands of cabins necessary to shelter such an army of mountaineers, and the providing of food and clothing for so great a number would, without question, add greatly

to the activities of the state—for a time, but—

"When the mountains are stripped and there is no more timber to put on the market:

"When the irrigated lands on the plains begin to feel the effects upon the water supply by reason of the deforestation of the mountains:

"When it is found that no further irrigation development by the storage of water is possible:

"When all further growth of our agriculture in this direction is at an end:

"When the so called mountain homes are deserted and the lands are sold for taxes with no buyers except the respective counties, what then? A blight. A set back from which there could be no recovery. A set back by the same cause that brought desolation and ruin upon Northern Africa, Syria and Babylonia, once cradles of learning and homes of the world's best progress."

The resolutions passed by the Association heartily endorse the policy being pursued by the Forest Service; which is opposed to turning over the forest reserves to the state, and pledges it support in its undertaking to protect the forests and improve their greatly dilapidated condition.

APPROVE A NATIONAL FOREST

AT a recent meeting of the District of Columbia Branch of the Woman's National Rivers and Harbors Congress a subject under discussion was the advisability of a national forest as a background and worthy setting for the Capital, with its classic buildings rising in stately splendor. The tract of land in view, which would be included in the proposed national forest, begins at Bladenburg and extends northeast twenty miles, until it

crosses the Patuxent River. The speaker said: "In all this tract includes about 41,000 acres. Separated from it by a narrow strip between Washington and Laurel, there is another body of 16,000 acres. Beyond the Patuxent it swings eastward, touching the Severn and South rivers and reaching the outskirts of Annapolis, the seat of the United States Naval Academy, and thereby adds another area of 43,000 acres. Another forest district of vital

importance to the nation's capital, containing some grand scenery which should be included in the purchase, borders the banks of the Potomac River from the District Line to a point beyond the Great Falls, an area of 10,000 acres. All of this is a region unsurpassed in natural beauty and wealth of vegetation. Sixty-five varieties of trees can be found upon it. It can be used for practical and scientific demonstration and will therefore be as useful as it will be ornamental."

NEWS AND NOTES

Flood and Forests

An object lesson and a very startling one of the value of forest conservation has been shown along the Mississippi river. The flood tide now sweeping through the lower valley of the Mississippi is inundating towns, paralyzing business, destroying agricultural prospects and causing property losses which will probably aggregate millions, not to speak of the loss of human life.

We have often spoken of the necessity of the forests to human safety and progress and the present destruction by flood in the Mississippi valley once more shows the imperativeness of forest conservation. The reports demonstrate that the calamity is largely due to the misbehaviour of the Ohio river from which raging torrents are pouring into the Mississippi. The states bordering the Ohio have not preserved their forests and now as the water accumulates from rains and from the spring thaws it is not held in check in the forests until absorbed by the earth. The forests that served as checks have gone and the pools unite and form rivulets and streams, gradually growing in size. They seek an outlet and find it, in the present instance to the great destruction of property, later loss resulting from the lack of storage and consequent shortage of water when needed to furnish the motive power for the wheels of industry.

The \$80,000 Appropriation

Prevention of the chestnut tree blight was discussed before the House Committee on agriculture on April 11, and the passage of Representative Moore's bill, appropriating \$80,000 for the purpose, as advocated by the American Forestry Association was urged by prominent men from Pennsylvania, New York and elsewhere. Representative Moore, who opened the discussion, said that the

The following were present: Mrs. Andrews, chairman of the committee on education; Mrs. Randolph Keim, Mrs. Herbert Knox Smith, Mrs. F. H. Newell, Mrs. Ballow, member from Hawaii; Mrs. A. P. Davis, Mrs. L. A. Williams, Mrs. M. P. Keith, Mrs. J. H. Shepperd, Mrs. I. W. Ball, Mrs. C. A. Miner, Mrs. Earnest L. Miner, Mrs. Richard B. Chew, Mrs. Clemons, Mrs. H. Compton, Mrs. A. E. Murphy, Mrs. J. E. Gadsby.

losses, due to the blight, had already reached \$25,000,000.

Harold Pierce, of Ardmore, secretary of the chestnut tree blight commission of Pennsylvania, told what Pennsylvania had done to protect trees in its own jurisdiction, and urged government aid to prevent the spread of the fungus elsewhere. Among other speakers were Deputy Forestry Commissioner I. C. Williams, of Pennsylvania; John Foley, forester of the Pennsylvania Railroad; H. W. Markel, plant pathologist, Bronx Park, N. Y., who is credited with having discovered the disease, and J. S. Holmes, State forester and geologist, North Carolina.

Forestry Conference Plan

At a meeting in Albany, New York, on April 10, of representatives of various State departments and educational institutions interested in forestry problems and work, the New York State conference of conservation of forest resources was formed on motion of Professor Walter Mulford, of Cornell University. State Superintendent of Forests C. R. Pettis was elected secretary.

The conferees agreed upon a comprehensive plan of State-wide activity for the reforestation and preservation of the forests of this State, together with the utilization of vast areas of soil now idle. Various committees were appointed to carry out this plan.

Killing the Bugs

A tubular gasoline torch designed especially for killing insect pests which damage trees and growing crops has been perfected by the Twiner Brass Works, of Sycamore, Ill. It produces a flame sufficiently large to cut off the supply of oxygen or air, which is essential to animal life, also enough heat to destroy the animal organism. This new

method has been found very effective and has been endorsed by many authorities of agriculture and horticulture. The habits of many insects have been studied and means have been found for trapping them as easily as catching rats and mice and they can be much more easily killed by means of this new torch.

This is especially true of the chinch bug which can be snared in passing from the wheat to the green corn when the wheat is being cut. This torch can also be used very effectively for destroying the eggs, larvae, etc., beneath the surface of the ground.

White Mountain Reserves

There has been sent to the Forest Reservation Commission at Washington by the Boston Chamber of Commerce a memorial adopted by the latter, requesting that the Nation may acquire by eminent domain within the fiscal year ending June 30, certain lands in the White Mountains.

At present the Forest Service has options on about 75,000 acres of land in this mountain tract. This stretch may be increased to 90,000, and the whole purchased for a National forest in the White Mountains,

providing the geological survey reports favorably within the given time.

That the purchase may be made seems probable in view of the recent favorable report of the Forest Service on some lands in the Southern Appalachians and the statement issued by them that they "hope to make a favorable report" on this district also.

Reforesting Pike's Peak

The Government has started work reforesting the north slope of Pike's Peak. The improvements proposed will cost about \$100,000, although the work planned for this year will take only about one-tenth of that appropriation. It will require about 10 years to complete the work.

The work outlined for this spring will cover a period of about two months. About 100,000 trees, including the Douglas fir, Englemann's spruce and the yellow pine, are to be replanted. Seeds from the same trees will be planted over about 1,000 acres.

The area which will be planted to seed and young trees is at the headwaters of Cascade creek, about three and one-half miles from Cascade. The Government has closed the work of planting seed on snow in an adjoining area of about 500 acres.

STATE NEWS

Washington

Twenty lumbermen, representing corporations and individuals owning timber worth many millions, and a half dozen state and government foresters, from California, Oregon, Washington, Idaho and Montana, met recently in Spokane for the annual business session of the Western Forestry and Conservation Association. Plans were outlined for the protection of the western forests against fire next summer. E. T. Allen, forester of the association explained to the members that under the Weeks' law creating the Appalachian forest reserve, all states protecting forests at the head of navigable streams are entitled to claim up to this amount from the government. Only the application is necessary.

"Oregon already has availed itself of this privilege," said Forester Allen. "There is no reason why the other four states of the association should not have their share. The Federal government appropriates the money on the condition that the state appropriates an equal amount to be used in protecting the sources of navigable streams. Money for this purpose, in excess of \$10,000, is already appropriated by each of the states named. There is, therefore, no reason why

the government aid should not also be secured."

Wisconsin

How Arbor day and Bird day and Fire Prevention day may help reduce the high cost of living is the lesson sought to be brought home to school children and others in the Arbor day annual issued by the Wisconsin State Department of Public Instruction. The annual is for the first time joined with the fire prevention cause.

"If we knew the amount savable annually by a wise forestry policy in reducing the cost of wood as a raw material in manufacturing industries," says the editor, "in lessening the cost of water power, and in lowering transportation charges on bulky commodities; if we knew the amount of annual loss to agriculture by insect pests which will be prevented by protection of bird life, and if we then were able to add to these amounts the \$200,000,000 of preventable fire loss, we should have a total annual saving of certainly not less than \$1,000,000,000, and possibly several times that amount.

"If this saving were equitably distributed there would be a substantial reduction in the cost of living for all."

Massachusetts

In Massachusetts negotiations have been carried on for some weeks between State Forester Rane and the State Department of Agriculture and the Government postal authorities in Washington with the result that the mail carriers of that State employed in the rural service will receive instructions as to their duties within a short time.

The plan suggested by the State Forester of Massachusetts and the one which has been ordered by the United States Government is to be put in operation, is that all rural mail carriers in Massachusetts be required to report any forest fires that they may discover while traveling over their routes to the forest warden or deputy warden residing nearest the fire.

In that State the average length of the rural mail routes is about 20 miles, and there are 300 rural mail carriers in the service, which through the adoption of this method, creates an auxiliary patrol service over 6,000 miles of country roads.

Maine

A recent item in the Bangor Commercial of Maine states that Land Commissioner Mace has just turned into the treasury of that State \$18,252.52, received for the sale of stumpage and rentals from the reserved school lands of the plantations and townships. It appears that the State of Maine has wisely retained control of sixty-nine different tracts of a thousand acres each in as many unorganized sections of the State, the timber land to be available for school purposes as soon as the townships are settled.

Oregon

Governor West has received copies of a bill which has been introduced in the Senate by Senator Chamberlain providing for the State to create a state forest through exchange of scattered school sections in Federal forests for a compact body of forest reserve lands. In substance, the bill makes the following provisions:

"That where any state or territory owns lands lying within the boundaries of a National forest, or where its right of indemnity selection in respect to school sections within such boundaries has not been fully exercised, said state or territory is hereby authorized, subject to the approval of the Secretary of Agriculture, to exchange such lands for or make indemnity selections of other National forest lands of like quantity and value; the same to be selected in reasonably compact bodies, which lands shall thereon be excluded from the National forests for the benefit of said state or territory.

"Provided, that in fixing the value of state school sections offered in exchange the Secretary of Agriculture shall take into consideration the value of such lands to the

State by reason of their being available and salable for script or base for indemnity selections."

California

Articles of incorporation for the California Forest Protective Association, a non-profit, co-operative corporation, have been filed in the office of Secretary of State Jordan. The purpose of the organization is the co-operation between forest land owners, Government and State authorities, for the better protection of California's wooded lands. The principal offices of the association are to be at San Francisco, and the fifteen directors, all of San Francisco, are the following:

Miles Standish, S. D. Johnson, R. W. Landon, C. R. Johnson, H. G. Lawrence, C. C. Smith, E. F. Metlan, M. L. Euphiat, R. T. Buzard, C. E. Kimbal, O. C. Haslett, C. A. Strong, L. O. Van Brundt, M. W. McIntosh, W. B. Weston.

Utah

District Forester E. A. Sherman reports forest conditions favorable in all sections of the country embraced in his district. The prospects for the season regarding range conditions, timber growth and protection, including the installation of fire-fighting apparatus, have never been brighter, and it is expected that better results will be obtained this year than in previous years.

Meetings of rangers and supervisors have been held in all parts of the district and the men from the field say the department could not well ask for better conditions. The watersheds are being protected better than ever before and the ranges have so improved in the past few years that stockmen are rejoicing over the abundance of grass and good water supply.

It is stated by the foresters that in districts where floods were frequent a few years ago, overflows are now almost unknown, the saving of life and property being almost beyond calculation. The preservation of trees and underbrush on the mountain sides and in the canyons has been the means of holding the snow longer in place and the flow of water in the springtime has not been so rapid as when the mountains were bare.

North Carolina

The Appalachian Forestry Reserve Commission has purchased 21,000 acres of woodland in Macon County at a cost of \$200,000.

The land was the property of the Macon County Lumber Company, which had cut a large portion of the lumber from it in the past ten years.

The immense tract which is now practically depleted of lumber will lie untouched for the most part for a number of years, as a forest reserve, while young trees which are now growing and which will be planted by

the Government, are allowed to reach timber size.

Idaho

Seeds from 20,000 bushels of white pine cones, recently gathered on the Kaniksu national forest reserve, in Northern Idaho, will be planted on the Coeur d'Alene, St. Joe, Lolo and Cabinet forests in districts swept by fire in the summer of 1910.

A seed extracting mill is being installed by the Government at the Falls Ranger station, and it is expected to secure 14,000 pounds of seed at a cost of about \$1 a pound.

Henry H. Farquhar, chief of planting of the United States Forest Service, who is in Spokane, reports that the cones were collected entirely from the squirrel caches. Operations were spread over a territory 22 miles in length and five miles in width, 100 men being located in four camps, each with two cooks and a camp foreman.

The men were paid by the day, with a bonus if they averaged a certain number of sacks each day. Several collected more than 10 two-bushel sacks a day during the 30 days they were at work.

Pennsylvania

The Sharpville, Pa., station of the Baltimore & Ohio Railroad is being cited as evidence that some of the so-called "soulless corporations" are not so soulless after all. At Sharpville the railroad company purchased extra land for tracks and a station in order to allow two beautiful specimens of the silver leaf maple tree to keep on growing on the right of way, although by chopping them down many hundreds of dollars would have been saved.

When the engineers ran their lines into town the plans called for the tracks to be laid over the ground now occupied by the trees. Then some of the officers of the company inspected the route and discovered the trees, and some lovers of trees made pleas for the preservation of the trees.

The pleas were heeded and the engineers had to run new lines and make plans for a curved track in order that the trees might stand undisturbed.

A similar condition cannot be found throughout the country, according to traveling men. It is not uncommon for strangers to stop and wonder at the sight of the trees growing between railroad tracks.

Michigan

In his report to the directors of the Northern Forest Protective Association, Chief Forester Thomas B. Wyman, of Michigan, said that the total loss suffered last year on lands over which the patrol existed was less than \$6,000. Many fires were extinguished in their incipency.

There are nineteen wardens in the service

of the association, and it was decided at the annual meeting to provide mounts for these men. The mounted forest rangers of the upper peninsula may, therefore, be expected to become picturesque figures.

It was the intention of the directors to raise the tax levy to seven-eighths of a cent an acre, in order to enlarge the scope of the work of protecting the forests against fires, but it developed that the increase of acreage expected the coming year will afford sufficient funds at the old rate of five-eighths of a cent an acre. The committee, however, reserves the right of calling further assessments in case the season should be particularly dry and necessitates additional precautions.

Massachusetts

The chestnut blight which has made its appearance in Massachusetts, has resulted in the placing on the market of considerable standing chestnut timber which, will become affected unless it is cut and used. The State owns as a reserve what is known as "Squaw peak" on Monument Mountain, and the State officials have decided that it is the advantage of the State to dispose of the standing chestnut that is on this reserve, and a number of contractors have been figuring on certain sections of it. There is quite a large quantity of chestnut timber on the mountain and most of it will probably be cut off. Individual owners are also becoming alarmed on account of the blight, and it is probable that considerable chestnut timber that has been held for a number of years will be disposed of within a short time.

New Hampshire

In the interest of further promoting forestry in the State of New Hampshire, the State Forest Commission have just issued an interesting circular, together with information that such tree-planted land will be subject to a tax rebate of 90 per cent the first 10 years, 80 per cent the next 10 years, and 50 per cent for the third period of 10 years.

Nearly every farmer or large land owner has some unproductive land on which he is paying taxes and getting no return. Such land, if planted to trees, will increase in value rapidly. Moreover, forest-planting in this region is no longer in the experimental stage. Enough plantations have been made to demonstrate the success of planting certain kinds of trees, and experience has developed cheap methods of planting. In the spring of 1911 the Forestry Commission distributed 230,000 trees. Reports made by the owners indicate that about eighty per cent of these trees survived the extreme drought of last summer and are growing well.

New Jersey

The New Jersey State Forest Commission

has been notified that the Postmaster-General has decided to order rural mail carriers to keep watch for forest fires and when one is seen to send word to the nearest fire warden.

This order is the outcome of a plan first proposed by the State Fire warden and taken up by him with the Post Office Department through the United States Forest Service at Washington, and is a further endorsement of the effort the Forest Commission is making to provide protection to the woodlands of the State.

Under the scheme, each rural mail carrier

will be furnished from Trenton with a list of the fire wardens in the territory through which his route runs. Also every fire warden will be notified of the arrangement and instructed to find out which carriers work in or near his district and let them know where he can be reached and how word may be gotten to him in the easiest and quickest way.

The United States Secretary of Agriculture has notified the Commission that the fund allotted to New Jersey for forest fire patrol in 1911, viz. \$1,000, will be doubled for 1912, making the amount \$2,000.

EDUCATIONAL

The Biltmore Class

Members of the Biltmore Forest School class who recently returned from Europe and spent a week in Washington, together with the alumni of the school in the various branches of the Forest Service, gave an informal smoker on Wednesday, April 17, at a Washington hotel. Besides the alumni and members of the class a number of prominent men were present.

After a most profitable instructive and interesting six months in Germany the class of thirty-five under the tutelage of Dr. C. A. Schenck returned at the end of March and then spent two weeks at Tupper Lake in the Adirondacks. From Washington they went to Newburn, S. C., and from there they go to Sunburst, near Asheville, and on to Cadillac, Mich., where they will spend the greater part of the summer. From there they go to Oregon, later returning East by way of Texas and Louisiana.

New Head for Forest School

Professor William Darrow Clark has been selected to fill the vacancy, due to the resignation of Dr. Hugh P. Baker, at "Penn State" Forest School. Professor Clark is especially qualified to succeed as head of this important Forest School and we prophesy a continuation of the success which the school has achieved in the past. Professor Clark is a graduate of the Yale Forest School, Class of '09, and has served an apprenticeship in the United States Forest Service. In September of 1909 he accepted an appointment as Assistant Professor of Forestry in the "Penn State" Forest School, where he has demonstrated his worth as teacher and executive. Kind and generous, yet with a keen sense of right and justice, he is a favorite with faculty and students alike, holding the respect and esteem of all.

With the change in her curriculum, the "Penn State" Forest School offers a four year undergraduate course unsurpassed in

the United States. Following the Sophomore year the students are given two months of field work on a 20,000-acre tract of virgin white pine in the western part of the State. Here are taken up the subjects of Mensuration, Surveying, Silviculture and Systematic Botany. A large mill in the immediate neighborhood offers opportunity for studies in mill scale and similar work. Following the Junior year the students are given an opportunity to spend a summer in the Forest Service or in the Forestry Department of one of the several States. In addition to this practical experience, the entire second semester of the Senior year is spent in the woods of the South and every facility is offered for a broad and comprehensive study of Lumbering and Management. This makes a total of about ten months practical work during the four-year course, sufficient time for a perfect correlation of theory and practice.

There are more than one hundred and fifty students enrolled in the forestry course and the present graduating class numbers thirty. Many of these men hope to enter the Forest Service, but an equal number are planning on private work in forestry; as timber estimators, woods agents, railroad foresters, park superintendents, and city foresters.

A New Ranger Course

The Department of Forestry of Colorado College (Colorado School of Forestry), announces that it will establish a one-year ranger course next fall. The purpose of this course is to give practical instruction to rangers or to those interested in ranger work. Such a course should ultimately improve greatly the efficiency of the ranger force on the National Forests. Engineering, estimating, silviculture, mensuration, grazing, and fire protection will be emphasized and there will be instruction in other subjects of practical usefulness in the Rocky Mountain Region. The course will be conducted

largely in the field—from September 10 to December 1, and from April 1 to June 28, on the College Reserve at Manitou Park. From December 1 to April 1, the course will be conducted at Colorado Springs.

The installation of this course is the result of the success of the ten-weeks ranger course given last winter.

At the same time the proportion of field work in the regular two-year technical course is to be greatly increased. The students will be at Manitou Park the same time as the rangers.

Ranger Course Closes

The students of the first ranger school finished their work in the department of Forestry at the University of Idaho on Friday, March 8. Thirteen students registered for this course, two of whom are already employed as rangers in the Forest Service; two others have decided to remain in the forest school and complete the entire four-

year course. The others will endeavor to secure employment in forestry work during the summer and either return to pursue additional forestry courses in the autumn or take the rangers examinations and enter the Government Service permanently.

Mr. Start's Position

Edwin A. Start, for three years past the secretary of the American Forestry Association, has gone to Seattle, where he became the director of the university extension work in the University of Washington. Mr. Start has done notable service in the forestry association for nearly ten years, having been secretary of the Massachusetts association before taking up the larger post. The position in the Northwest is a large one, the university having 3,000 students and having grown the last ten years with great speed. It is interesting that it was begun when the city had only one hundred and forty-nine inhabitants.

CURRENT LITERATURE

MONTHLY LIST FOR APRIL, 1912

(Books and periodicals indexed in the Library of the United States Forest Service)

Forestry as a Whole

Noyes, William. Wood and forest. 309 p. il. Peoria, Ill., The manual arts press, 1912.

Bibliographies

Stockbridge, Helen E., comp. A bibliography of the southern Appalachian and White Mountain regions. 82 p. Wash., D. C., Society of American foresters, 1911.

Proceedings and reports of associations, forest officers, etc.

Canada—Dept. of the interior—Forestry branch. Report of the Superintendent of forestry. 133 p. il. Ottawa, 1911.

Massachusetts—State forester. Eighth annual report. 1911. 145 p. pl. Boston, 1912.

Schlesischer forestverein. Jahrbuch für 1911. 198 p. Breslau, 1912.

Union of South Africa—Forest department. Report of the chief conservator of forests for the year ending 31st December, 1910. 30 p. pl. Cape Town, 1911.

Forest Education

Arbor day

New Jersey—Public instruction, Dept. of. Arbor day, 1912. 31 p. Trenton, N. J., 1912.

Forest schools

Harvard university—School of forestry. Prospectus, 1912-13. 24 p. il. Cambridge, Mass., 1912.

Forest Description

Holmes, J. S. Forest conditions in western North Carolina. 116 p. pl., maps. Raleigh, N. C., 1911. (N. C. Geological and economic survey. Bulletin 23.)

Forest Botany

Trees: classification and description

Maiden, J. H. The forest flora of New South Wales, pt. 46. 22 p. pl. Sydney, Govt. printer, 1911.

Seton, Ernest Thompson. The forester's manual, or, The forest trees of eastern North America. 141 p. il. Garden City, N. Y., Doubleday, Page & Co., 1912.

Silviculture

Planting

Perez, G. V. and Jahandiez, E. Recherches sur la germination des graines de genévrier. 3 p. Toulon, Imp. Mouton, 1912.

Forest Protection

Insects

Stebbing, E. P. On some important insect pests of the coniferæ of the Himalaya with notes on some insects predaceous and parasitic upon them. 39 p. pl. Calcutta, Supt. govt. printing, 1911. (Indian forest memoirs, Forest zoology series, v. 2, pt. 2.)

Diseases

- Chestnut tree bark disease conference. Resolutions adopted at Harrisburg, Pa., Feb. 21, 1912. [3] p. Harrisburg, Pa., 1912.
- Heald, Frederick D., and Wolf, Frederick A. A plant-disease survey in the vicinity of San Antonio, Texas. 129 p. il., pl. Wash., D. C., 1912. (U. S.—Agriculture, Dept. of—Plant industry, Bureau of. Bulletin 226.)
- Spaulding, Perley, and Field, Ethel C. Two dangerous imported plant diseases. 29 p. il. Wash., D. C., 1912. (U. S.—Agriculture, Dept. of. Farmers' bulletin 489.)

Forest management

- United States—Agriculture, Dept. of—Forest service. Assistance to private owners in the practice of forestry. 8 p. Wash., D. C., 1912. (Circular 203.)

Forest mensuration

- Fankhauser, Franz. Praktische anleitung zur holzmassenaufnahme für unterförster, bannwarte, privatwaldbesitzer und holz-industrielle. 105 p. Bern, Fr. Semminger vorm. J. Heuberger's verlag, 1909.

Forest Economics*Statistics*

- Alsace-Lorraine—Abteilung für finanzen, handel und domänen. Beiträge zur forststatistik von Elsass-Lothringen, hft. 29, 1910. 130 p. Strassburg, 1912.

Forest Administration*National and state forests*

- United States—Interior, Dept. of the. Rules and regulations for the sale and use of timber upon the unreserved public lands in the district of Alaska. 5 p. Wash., D. C., 1912. (Circular 85.)

Forest Utilization

- Burdon, E. R. The study of timber and forest products in America: a report presented to the forestry committee of the University of Cambridge. 24 p. Cambridge, Eng., University press, 1912.

Wood using industries

- Gould, Clark W. and Maxwell, Hu. The wood-using industries of Mississippi. 12 p. New Orleans, Lumber trade jr., 1912.
- Hatch, Charles F. and Maxwell, Hu. Wood-using industries of Missouri. 16 p. St. Louis, Mo. St. Louis lumberman, 1912.
- Red cedar shingle manufacturers' association. The red cedar shingle. 18 p. il. Seattle, Wash., 1912.
- United States—Agriculture, Dept. of—Forest service. Paper pulps from various forest woods; experimental data and specimens of soda and sulphite pulps, compiled by Henry E. Surface. 29 p. 55 pl. Wash., D. C., 1912.

Forest by-products

- Singh, Puran. Memorandum on the oil value of some sandal woods from Madras. 11 p. Calcutta, 1911. (India—Forest dept. Forest bulletin, n. s., no. 6.)
- Singh, Puran. Note on the chemistry and trade forms of lac. 20 p. Calcutta, 1911. (India—Forest dept. Forest bulletin, n. s., no. 7.)

Auxiliary Subjects*Botany*

- Griffiths, David. The grama grasses, Bouteloua and related genera. 86 p. il., pl. Wash., D. C., 1912. (Smithsonian institution—United States national museum. Contributions from U. S. national herbarium, v. 14, pt. 3.)
- Schneider, Albert. Pharmacal plants and their culture. 175 p. Sacramento, California, 1912. (California—Forestry, State board of. Bulletin 2.)

Agriculture

- Fisher, Martin L. and Cotton, Fassett A. Agriculture for common schools. 381 p. il. N. Y., Chas. Scribner's sons, 1910.

Clearing of land

- Thompson, Harry. Cost and methods of clearing land in western Washington. 60 p. il. Wash., D. C., 1912. (U. S.—Agriculture, Dept. of—Plant industry, Bureau of. Bulletin 239.)

Water power

- United States—Commerce and labor, Dept. of—Corporations, Bureau of. Report on water-power development in the United States. 220 n. maps. Wash., D. C., 1911.

Periodical Articles*Miscellaneous periodicals*

- Agricultural journal of the Union of South Africa, Feb. 1912.—Forestry for farmers, by G. A. Wilmot, p. 8.
- Botanical gazette, Jan. 1912.—An isolated prairie grove and its phytogeographical significance, by H. A. Gleason, p. 38-49.
- Breeders' gazette, March 13, 1912.—Erosion of agricultural lands by J. C. Pridmore, p. 647-8.
- Country life in America, March 15, 1912.—The cheapest house; the log cabin, by A. R. Ellis, p. 39-41.
- Gardners chronicle, March 2, 1912.—The giant cypress of Formosa, by A. Henry, p. 132-3.
- House beautiful, Jan. 1912.—The gentle art of pruning, by E. B. Clark, p. 58-60.
- Outing, March 1912.—Sugar trees and honey trees, by E. P. Powell, p. 700-5.
- Scientific American, March 16, 1912.—The chestnut tree blight; an incurable disease that has destroyed millions of dollars worth of trees, p. 241-2.
- Scientific American supplement, Jan. 27, 1912.—The kola tree and its seed, p. 51.

World to-day, Feb. 1912.—Mysterious octopus, the lumber trust, by C. E. Russell, p. 1735-50.

Trade journals and consular reports

American lumberman, March 16, 1912.—How forests can take measures to prevent forest fires, by G. E. Marshall, p. 46 D; Timber in Australia, by L. C. Moore, p. 51.

American lumberman, March 30, 1912.—Utilization of waste, by J. M. Gibbs, p. 46 B-C; Various ways of utilizing sawdust, by C. W. R. Eichhoff, p. 47.

Barrel and box, March 1912.—The price of lumber, by R. S. Kellogg, p. 53-5.

Canada lumberman, March 15, 1912.—Fire fighting, by J. F. Kimball, p. 44-5.

Canada lumberman, April 1, 1912.—Lumber industry in New Brunswick, p. 28-9; Keeping fire out of forest reserves, by H. R. Macmillan, p. 38-9; Passing of the amateur ranger, p. 40-1.

Engineering news, April 4, 1912.—Preservation of power transmission poles, by W. R. Wheaton, p. 624-5; The timber supply, and the railways, p. 642-4.

Engineering record, Jan. 20, 1912.—Various features of wood preservation, p. 76-81.

Engineering record, Feb. 10, 1912.—Creosoted wood block pavement with cement grout filler, by A. J. Schafmayer, p. 153-4.

Hardwood record, March 25, 1912.—Lumbering in the West Indies, by H. C. Kluge, p. 29-31.

Hardwood record, April 10, 1912.—Evolution in lumber seasoning, p. 29-31; Wood composite flooring, p. 37-8.

Lumber trade journal, March 15, 1912.—The wood-using industries of Mississippi, by C. W. Gould and H. Maxwell, p. 19-29.

Lumber trade journal, April 1, 1912.—Mississippi's freak land taxation measure, p. 36.

Lumber world review, March 25, 1912.—Efficient forestry methods, by J. L. Bridge, p. 17; The use of wood in Illinois, by R. S. Kellogg, p. 24, 27.

Mississippi Valley lumberman, March 29, 1912.—Forest industry, by E. T. Allen, p. 42-3; Experiments in wood preservation; work being done at the Forest Service laboratory at Madison, Wis., p. 43.

New York lumber trade journal, March 15, 1912.—Forestry committee report, National wholesale lumber dealers' association, p. 55-6.

Paper trade journal, March 7, 1912.—Paper making in the south, by E. S. Farwell, p. 40, 44.

Paper trade journal, March 28, 1912.—A log loader, p. 44; Manufacture of cellulose from wood, by E. L. Rinman, p. 48, 56, 60.

Paper trade journal, April 4, 1912.—Removing bark from logs, p. 44, 48, 50.

Pioneer western lumberman, March 15, 1912.—Replanting cut-over lands, p. 28.

Pioneer western lumberman, April 1, 1912.—California conservation commission and timber taxation, p. 21-5.

Pulp and paper magazine, March 1912.—The degradation of mechanical wood pulp during storage, by F. Barnes, p. 80-4.

St. Louis lumberman, March 15, 1912.—Relation of railroads to the lumber industry, by B. F. Bush, p. 54-5; The wood-using industries of Missouri, by C. F. Hatch and H. Maxwell, p. 68-83; Types and uses of the "American" log loader, p. 90 A-B.

St. Louis lumberman, April 1, 1912.—The Black forest; Biltmore doings, p. 44.

Southern industrial and lumber review, March 1912.—A splendid presentation of wood paving, p. 28, 80-1.

Southern lumberman, March 23, 1912.—Recent experiments in distillation of wood at government laboratory, p. 30.

Southern lumberman, April 13, 1912.—Forest fire problem in southern states, chief topic discussed at notable conference of foresters and lumbermen at Nashville, p. 32-5; Forest problem in the south, by H. S. Graves, p. 35; Waste of forest resources by insects, by A. D. Hopkins, p. 36-8; Methods of combating the southern pine beetle, by E. B. Mason, p. 38.

Timber trade journal, March 30, 1912.—Cutting wrest planks, p. 446; The export wood trade of Russia, p. 481-526; The Säfveans Aktiebolag; scientific box making, p. 532-3; Review of the timber trade of 1911, p. 561-626; Lumber trade of Sweden, 1911, p. 627-38; Lumber trade of Norway, 1911, p. 639; Lumber trade of Finland, 1911, p. 641; Lumber trade of Austria-Hungary, 1911, p. 642; Lumber trade of Canada, 1911, p. 643-5; Lumber trade of the United States, 1911, p. 646-7; Lumber trade of Germany, Spain, Holland and France, 1911, p. 648-9; Recent improvements in power and its transmission, by M. P. Bale, p. 651-4; Sawmill machinery made by British manufacturers, p. 655-94.

United States daily consular report, April 5, 1912.—The extensive German forests, by A. M. Thackara, p. 71.

United States daily consular report, April 13, 1912.—Shade-tree planting in Prussian city, by F. D. Hill, p. 188.

West Coast lumberman, March 1912.—Creosoted block paving, by G. Winslow, p. 389-90.

Wood craft, April 1912.—The economical piling of lumber, by J. F. Hobart, p. 4-6; Working in rare and valuable woods, by G. E. Walsh, p. 24-5.

Forest journals

Allgemeine forst- und jagd-zeitung, Jan. 1912.—Die standortsuntersuchung beim forstlichen versuchswesen, by Leistner, p. 1-3; Einige untersuchungsverfahren, p. 3-11; Zur zinseszinsrechnung, by Fischer, p. 11-19.

- Allegemeine forst- und jagd-zeitung, Feb. 1912.—Wald und wild by Jürgens, p. 45-7.
- Bulletin de la Société centrale forestière de Belgique, Feb. 1912.—Commerce de bois dans l'empire austro-hongrois, by H. de Laubespain, p. 78-94.
- Bulletin de la Société centrale forestière de Belgique, March 1912.—L'amélioration et l'extension des forêts au point de vue du régime des eaux, by O. Richir, p. 139-151.
- Canada forestry journal, Jan.-Feb. 1912.—The thirteenth annual convention, p. 1-22; La forêt, la température et le régime des pluies, p. 25-6.
- Centralblatt für das gesamte forstwesen, Jan. 1912.—Das verschwinden der eichenwäldungen und die bedeutung des eichenholzes für die brauindustrie, by H. Jirsik, p. 16-23; Bodenrentenlehre und umtriebsregel des jährlichen betriebes, by C. Hub, p. 23-9; Die wirtschaftlichen verhältnisse Japans, by J. M., p. 45-50; Anpassung des eichhörnchens an grosse sprünge, by R. Kowarzik, p. 50-1.
- Centralblatt für das gesamte forstwesen, Feb. 1912.—Einige beziehungen zwischen wald und wasser, by J. Sigmond, p. 55-69; Über die notwendigkeit einer aufforstungsaktion im höheren böhmischen Erzgebirge, p. 93-6.
- Forestry quarterly, March 1912.—Method of taking impressions of year-rings in conifers, by L. S. Higgs, p. 1-2; New tools for transplanting conifers, by W. H. Mast, p. 3-8; Scientific management and the lumber business; a possible field for foresters, by E. A. Braniff, p. 9-14; Boom areas, by A. M. Carter, p. 15-16; Reproduction of lodgepole pine in relation to its management, by N. C. Brown, p. 17-23; Progress in sales of fire-killed timber in Idaho and Montana, by W. B. Greeley, p. 24-6; Results of direct seeding in the Black Hills, by J. Murdock, p. 32; Operations under the Weeks law in the southern Appalachians and White Mts., p. 33-7; Permanent sample plots, by T. S. Woolsey, p. 38-44; Some needs in forestry education, by H. P. Baker, p. 45-9; Management of western yellow pine in the southwest, by B. Moore, p. 51-6.
- Forstwissenschaftliches centralblatt, Feb. 1912.—Ueber die beziehungen zwischen der massen und der geldverzinsung in hochwaldbetriebsklassen, by Eberbach, p. 77-80; Die dürre des letzten sommers im walde, by Krug, p. 81-9.
- Forstwissenschaftliches centralblatt, March 1912.—Aus den nordischen wäldern des Europäischen Russlands, p. 150-60.
- Hawaiian forester and agriculturist, Feb. 1912.—Forestry at the sugar planters' meeting, p. 62-5; Notes on some Honolulu palms, by V. MacCaughy, p. 66-74.
- Indian forest records, Oct. 1911.—The host plants of the sandal tree, by K. Rao, p. 159-207.
- Indian forester, Feb. 1912.—The calculation of the yield by the number of trees under the selection system, by R. S. Troup, p. 75-84; New forest legislation in Italy, p. 110-13.
- North woods, Feb. 1912.—The conference with the railroads, p. 6-10; How to set apart the state's non-agricultural lands for forestry purposes, by C. C. Andrews, p. 10-14.
- Revue des eaux et forêts, March 1, 1912.—La critique de l'école de Nancy, by C. Guyot, p. 129-37.
- Schweizerische zeitschrift für forstwesen, Jan. 1912.—Zur bestimmung des abstandes von einbauten beim lawinenverbau, by F. Fankhauser, p. 11-21; Hitze-risse, by F. Fankhauser, p. 21-6.
- Schweizerische zeitschrift für forstwesen, Feb. 1912.—Die behandlung der gebirgswälder im bereich von eisenbahnen, p. 37-45; Die witterung des jahres 1911 in der Schweiz, by R. Billwiller, p. 45-54.
- Tharander forstliches jahrbuch, 1911.—Untersuchung des standortes der forstlichen versuchsflächen in den kgl. sächs. forstrevieren Lauter abt. 19 und Reudnitz abt. 13, by K. Leistner, p. 143-91; Die forstwirtschaft Schwedens, by F. Diepenhorst, p. 192-216; Zur ermittlung des zulangens der nährstoffe im waldboden, by H. Vater, p. 217-71; Gesetze, verordnungen und dienstanweisungen welche auf das forstwesen bezug haben, für das Königreich Sachsen, 1910, by Flemming, comp., p. 273-309.
- Tharander forstliches jahrbuch, 1912.—Das licht als produktionsfaktor in der forstwirtschaft, by R. Beck, p. 4-28; Die ökonomischen aufgaben der forstwirtschaft mit besonderer berücksichtigung der preussischen staatsforsten, by Martin, p. 40-58; Einiges vom waldmantel; ans der sächsischen forsteinrichtungspraxis, by Deicke, p. 64-78.
- Zeitschrift für forst- und jagdwesen, Jan. 1912.—Bodenuntersuchungen im gebiete der Lüneburger heide, by R. Albert, p. 2-10; Aus dem grossherzogtum Oldenburg, by Guse, p. 10-15; Zur wirtschaftlichen interpretation der bodenertragswertformel, by E. Ostwald, p. 16-20; Einige bemerkungen zur provenienzfrage, by A. Orłowsky, p. 20-6; Rabat-tenkulturen und ihre erfolge, by Emil Stölze, p. 26-33.
- Zeitschrift für forst- und jagdwesen, Feb. 1912.—Unsere holzeinfuhr und ihr zusammenhang mit der allgemeinen wirtschaftlichen lage, by Schilling, p. 85-95; Alte und neue verfahren der anlage gemischter bestände, by Kienitz, p. 96-105; Die reinertrage der forsten und der grundsteuereinertrag, by Buhr, p. 105-9.

Plans have been completed for the annual meeting of the National Lumber Manufacturers' Association at Cincinnati on May 7 and 8, and a number of prominent speakers will read papers and make addresses on subjects of importance.

At the twenty-sixth annual meeting of the Lumbermen's Exchange of Philadelphia, W. T. Betts was elected president; Benjamin Stoker, vice-president; Charles P. Maule, treasurer.

John Muir recently found in the forests of Brazil along the Parana a large number of araucarias, called by the natives Brazilian pine, and growing 120 feet tall. The foliage of the trees was in bunches at the tops. The spines on the trees prevent the monkeys from climbing them and they are called "monkey puzzles."

A final warning in regard to the pine beetle has been issued by Dr. A. D. Hopkins, of the United States Bureau of Entomology, who announces that infested trees may safely be destroyed until May 1, but that after that time felling of live or dead pine timber will only aggravate the ravages of the pine beetle.

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EXTINCT VOLCANOES OF NORTHEAST NEW MEXICO

By WILLIS T. LEE

TRAVELERS over the Santa Fe route in Colorado and New Mexico are probably all familiar with the striking scenic features near Raton Pass. Chief among these is Fisher's Peak, the most conspicuous object in view as one approaches Trinidad. It is an impressive mass of rock that rises more than 3,500 feet above the city, where the traveler stops for refreshment and where the engine that has raced for hours over the plain retires and gives place to fresh ones that pant and throb with impatience for the long climb over the pass. This peak, which by the way is not a peak at all, but is the point of a flat-topped table-land known as Raton Mesa, has a pointed appearance when viewed from below, because of the angle of observation. It is the northwestern extremity of a volcanic region stretching eastward through southern Colorado and northeastern New Mexico into Oklahoma, a distance of more than 80 miles. It is far removed from the Rocky Mountains, its western extremity being nearly 50 miles from the foothills.

This region contains many unique and attractive scenic features, but for the most part these lie at considerable distances from ordinary lines of transportation, and because they are in a sparsely settled and little known part of the country almost nothing is known of them by the general public. The volcanic activity of former times is evidenced in this region by the pres-

ence of great sheets of lava, dikes, plugs, intrusive sills, conical mountains of igneous rock obviously of volcanic origin but without depressions at their summits indicative of craters, and other mountains which are unquestionably volcanic but wanting in the symmetry of form that usually characterizes a volcano.

The lava flows date back to some unknown period whose antiquity it is quite useless to speculate upon. Since the time of the flow of which Fisher's Peak constitutes a part, erosion has removed from the country to the north rocks about 3,500 feet thick. The mesa maintains its form because of the superior hardness of the igneous rock at the top. This covering varies in thickness from 100 feet or less to 500 or 600 feet. It was not formed by a single welling out of molten rock, but by many successive flows. It consists of numerous sheets, probably separated by long intervals of time, and were the history of the lavas known it would doubtless prove to be a long and varied one, extending over centuries of time; and yet, as compared with the duration of time that the volcanic forces have been active here, the formation of the lava sheet seems like a single event. The surfaces of these great mesa flows are more or less irregular, and from them rise such elevations as Red Mountain and Townsend Peak. The summit of the latter rises about 450 feet above the general



FISHER'S PEAK AS SEEN FROM NEAR TRINIDAD, COLO.; A PART OF THE RATON MESA STANDING 3,500 FEET ABOVE THE POINT OF OBSERVATION.

level of the mesa and Red Mountain is considerably higher. These elevations have the conical form of volcanoes, but if they ever possessed craters all evidences of them have been destroyed.

The older and more extensive sheets of lava are supposed to be products of fissure eruption. The molten rock welled up through great cracks in which the lava finally solidified, giving rise to the dikes now exposed in the eroded areas surrounding the mesas. In some places also the lava was extruded through relatively small pipes. In these pipes the lava consolidated and inasmuch as it is harder than the rocks through which it found passage, it has not been eroded so fast as the soft rock surrounding it, and the solidified filling of the pipes now protrude from the surface as "plugs" such as Water-vale Butte.

After the first group of lava flows had been formed, there seems to have

been a cessation of volcanic activity and the lavas were attacked by erosion. The sheets were cut through and great quantities of them, as well as of the older rocks, were eroded away. Then the dormant forces became active again and other lava sheets were formed in the degraded areas below the older sheets. The younger lavas, at least in part, issued from volcanic vents and the volcanoes formed about these vents still remain, but in their turn these lavas were attacked by erosion and deeply dissected before still later eruptions occurred, resulting in the recent flows and in such perfect cinder cones as Mount Capulin and others illustrated in this paper, a dozen or more of which were formed.

There were three well-marked periods of volcanism in this region separated by long periods of time and doubtless numerous less well-marked



CAPULIN MOUNTAIN, AN EXTINCT VOLCANO OF RECENT ORIGIN, NEAR FOLSOM, N. M., AS SEEN FROM THE TOP OF A NEIGHBORING VOLCANIC PEAK FIVE MILES AWAY. THE CINDER CONE RISES NEARLY 1,500 FEET ABOVE THE PLAIN.

periods will be recognized when the region is studied in detail. Three periods are well illustrated in the canyon of the Dry Cimarron, where the rim of the canyon consists of lava belonging to one of the ancient sheets. This sheet was eroded and the canyon cut down nearly to its present depth when a flood of lava was poured into it probably from the crater of Mount Emery, an extinct volcano standing about a mile south of the Cimarron. The sheet thus formed within the canyon was later partly eroded away. The bed of the canyon was lowered slightly below its present level when a great stream of lava, presumably from Capulin, flowed down the canyon for a distance of about 27 miles filling the stream bed and overflowing it in some places, spreading to the confining walls of the canyon. The surface of this youngest lava constitutes the present floor of the canyon.

Just as there are three conspicuous and well-defined periods of lava flow in this region, so are there three distinct groups of extinct volcanoes which correspond in time, in a general way, to the lava flows. The oldest is represented by Sierra Grande which is the only one of this group known to the writer; the second, by Robinson, Emery; and half a dozen unnamed peaks; and the youngest group by Capulin, the Horseshoe, and a large but undetermined number of volcanic cones of recent origin.

THE SIERRA GRANDE

Sierra Grande forms one of the most conspicuous geographic features of the volcanic region of northeastern New Mexico. It is a conical mountain of volcanic origin, about 10 miles south of Folsom, New Mexico, standing

alone on the great plain, which toward the east, south, and west stretches away nearly level as far as the eye can reach. It is the largest and probably the oldest of the extinct volcanoes in the region described. If there are older volcanic mountains the evidence of their extrusive origin has not been found. Its altitude is given on some of the maps as 11,150 feet, but my aneroid registered little more than 8,000 feet at the top. The cone is nearly circular in outline and the slopes of the sides are gentle. There is a fairly well-marked crater at the summit, but one side is broken down, leaving a crescent-shaped rim enclosing the old crater which was estimated to be half a mile across. This rim is gently rounded at the top, and its breadth in some places is quarter of a mile or more.

The rock is dark colored andesitic lava varying in character from vesicular to compact. No cinders or scoriaceous material was found on the outcrops, but beds of red cinders occur within the crater. The slopes seem to be made up of successive flows of lava having approximately the same gradient as the mountain slopes, so that the mass seems to be composed of concentric layers like an onion. The outer edge appears to be lobed, due to the extension of some flows beyond the limit of others, but this character was noted only from a distance. No evidence of explosive action was found in Sierra Grande. The character of the rock and the gradient established by its flows indicate a volcano of quiet action in which the lava poured over the rim or broke through the side without violent demonstration as that from Kilauea does at the present time.

Canyons have been cut to a depth of 200 feet or more in the sides of Sierra Grande. Erosion to such a depth in hard andesitic rock in a semi-arid region where the only water available for erosive work is the slight amount that falls on an isolated cone, is evidence of a long period of time. No canyons at all comparable to those of Sierra Grande were found on other vol-

canic cones of this region. This, together with the subdued form of the cone and the rounded contours of its surface, seems to place Sierra Grande in a class apart from the other volcanic mountains of the region and to prove that it is the oldest of the cones now known to be of extrusive origin.

ROBINSON MOUNTAIN

Robinson is the name given to a volcanic mountain located about 7 miles southwest of Folsom, New Mexico. It has an altitude of about 8,000 feet, but inasmuch as the cone rests upon a broad and rather high mesa it is much less conspicuous than the neighboring mountains of about the same altitude. The sides of the cone are steep in some places, but on the whole the approach to the summit is easy. There is a well-defined depression in the summit but the confining rim is broken away on one side so that the crater has a cirque-like form. The rock is highly scoriaceous and much of it has the character sometimes known as "rock foam," that is, the gas cavities constitute so large a proportion of the rock that it will float in water like a cork. In some of this rock the gas cavities are so uniform in size and so regularly distributed that some people who are ignorant of its origin call it petrified honeycomb.

The fact that Robinson Mountain is younger than Sierra Grande and older than Capulin is proved in several ways. Although composed of rocks much softer than that of Sierra Grande, it has not been so deeply dissected by erosion and it rests on a lava platform much lower than the lavas of the high mesas that resulted from the earlier volcanic eruptions. On the other hand, the platform is much higher than that on which Capulin stands, and the rounded outlines and soil-covered surface are in marked contrast with the rough, angular outlines and fresh appearance of the "mal pais" surrounding the younger cones.

CAPULIN MOUNTAIN

Capulin is the name given to a magnificent example of extinct volcano near

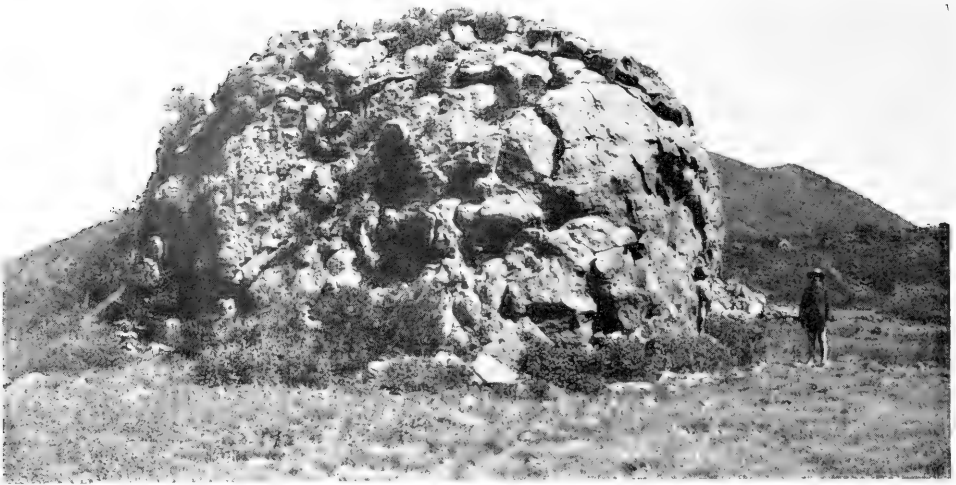


CAPULIN MOUNTAIN AS SEEN FROM THE PLAIN BELOW IT.

Folsom, New Mexico, about 30 miles southeast of Raton. Until recently it has been readily accessible only from Folsom, a small town on the Colorado and Southern Railway, but recently a railroad has been constructed from Raton eastward which passes within three miles of the summit. The mountain has an altitude of about 8,000 feet or about 1,500 feet above the general level of the plain on which it stands. There is a broad platform at its base built up by successive flows of lava, and on this platform rests a steep-sided crater cone nearly circular in outline and probably a mile and a half in diameter at the base, having a well-defined crater at its summit. The bottom of the crater is about 75 feet lower than the lowest part of the rim and about 275 feet lower than the highest part. Its diameter from rim to rim was estimated at 1,500 feet.

The lava platform on which the cone stands is composed of scoriaceous, ropy lava evidently extruded from Capulin in the early stages of its vol-

canic activity, in successive flows separated by considerable periods of time. Some of the older lavas where they were not covered by more recent ones have decomposed at the surface forming a thin layer of soil in which grass and shrubs have taken root. Some of the younger flows have all the earmarks of recent origin. They are very slightly decomposed, are scoriaceous and ropy, and have fractured crust, cavernous openings, blister cones, etc. In short, they form typical "mal pais." The appearance of the nearly vertical faces of some of the more recent flows suggests a rapidly advancing tidal wave frozen in transit. As the surface of the molten rock cooled the solid crust at the advancing front was fractured and rolled under, and when the whole mass ceased to move this rolling front stopped in the position seen at the present time. In some places where the nearly vertical front is 25 to 30 feet high, scarcely a block has fallen from it, so recently was it formed.



A "BLISTER CONE" AT THE BASE OF CAPULIN MOUNTAIN.

It is probable that in its early stages Capulin was a much broader volcano than its present cone would lead one to believe. The quantity of material outpoured would seem to require a very large vent. Lava that would flow 27 miles before it congealed, as in the case of the flow down the Dry Cimarron, would seem to require a larger crater than the one now in evidence in Capulin Mountain. Furthermore, there are remnants of what may have been an old crater rim outside of the present cone. The crater cone is composed in part of flow lava, in part of cemented breccia, and in part of unconsolidated cinders. The cinders are rather fine and make climbing difficult, inasmuch as one's feet sink ankle deep into them at every step. The occurrence of these loose cinders in the sides of the mountain where the conditions for rapid erosion are most favorable speaks rather eloquently of the recency of the eruptions that extruded them. The formation of the cinder cone was the last and relatively feeble effort of the dying forces, but although it is surrounded by several small craters, no solfataras, hot springs or other evidences of slumbering fires have been found.

"MAL PAIS"

Near Capulin, as in many other places in the volcanic region, there are extensive sheets of fresh lava, which in New Mexico are ordinarily called *mal pais*, a name meaning "bad country." The appropriateness of this name becomes forcefully evident when one attempts to cross a field of fresh lava. It is said by some that the name was applied years ago by soldiers who had been sent to fight the Indians. No hoofed animal can make its way for any considerable distance over fresh *mal pais*, for the knife-like edges of the lava cut its hoofs to pieces in a short time. Knowing this fact, the Indians, when chased by cavalymen, took refuge in the lava fields where they were acquainted with the tortuous trails that led through the *mal pais*. The cavalymen could not follow these, and once off the trail their horses were soon disabled.

There were probably reasons other than safety why the Indians frequented the *mal pais* fields. Small caves are numerous, formed by the still fluid lava flowing from beneath a hardening crust. These caves afforded shelter for the savages. Smaller cavities offer shelter for rabbits that inhabit the *mal pais* fields in countless myriads. These



HORSESHOE MOUNTAIN, A VOLCANIC CINDER CONE OF RECENT ORIGIN, NEAR CAPULIN MOUNTAIN.

in turn attracted wolves, wild cats, and other savage animals, as well as savage men, so that good hunting was afforded as well as safe habitation. Also, the cavernous "mal pais" has the power of this semi-arid region, and springs of pure water often occur in or near it, although in other kinds of rock in the same region the springs may be very poor or wholly wanting.

BLISTER CONES

Blister cone is a name applied to certain elevated parts of the surface of mal pais. They are often conical, globular, or elliptical, and consist of irregularly shaped blocks of lava. In the more perfect ones these blocks are arranged in symmetrical order as if fitted together by design. Obviously, they were formed at a time when a solid crust had formed at the surface of the lava that was still viscous below, and shortly before the whole mass ceased to move. Thus the rigid crust buckled and broke as the viscous mass beneath continued to move. The early blisters were destroyed entirely; later ones, broken and warped out of shape, appear now as heaps of blocks without symmetry of form; still later ones appear in such perfect symmetry as the

one illustrated; and the last to form may appear as oval mounds of slight elevation. Blisters may be found showing every stage from the first slight buckling of the crust to unsightly heaps of angular blocks.

In the more perfect blisters the form and structure indicate that the blocks are parts of a once continuous crust or sheet of lava, although they are now separated by considerable distances. In many places the cavities are large enough for a man to crawl through. Into the base of one of these blisters near Capulin, a young man who accompanied the writer made his way on hands and knees, and after a tortuous passage among the blocks he emerged from the top, 20 feet above the point where he had entered. This, however, is an operation that few would care to repeat, for the knife-like edges of the lava cut one's clothing and lacerate one's hands. But the more serious objection arises from the fact that rattlesnakes which infest this region regard these cavities as their own private domain. The dark-colored lava is warmed by the rays of the sun, and these venomous "sons of Satan," as they are often called, seem to find conditions here quite to their liking. Their



WATERVALE BUTTE, A VOLCANIC PLUG OF BASALTIC ROCK IN SOUTHERN COLORADO, SURROUNDED BY SOFT SHALE.



ROBINSON MOUNTAIN, AN EXTINGUISHED VOLCANO NEAR FOLSOM, N. M. MOUNT EMERY, ANOTHER MOUNTAIN OF VOLCANIC ORIGIN, APPEARS IN THE DISTANCE AT THE LEFT.

color differs but little from that of the lava, and it is no uncommon thing for beast or man to step on a sleeping reptile before he knows of its presence. Fortunately, a rattlesnake will usually give warning of his belligerent intent before beginning hostile operations, and he prefers blissful solitude to the society of those who never neglect an opportunity to bruise his head. Nevertheless, while in the lava fields, the writer learned, after several narrow escapes, to examine a rock rather carefully from a biological point of view before examining it geologically or before sitting down on it to rest. The snake is especially peevish about his sun bath, and the man who disturbs his numbers by sitting down too near is very likely to rise again without

cinders. It is nearly circular in outline and the rim of the crater is broken down on one side, giving to the crest the general form of a horseshoe. The cone rests on a broad platform of flow lava that is relatively old. Its surface is rolling, and it is covered with soil, but the cinder cone is very young. Although it is composed of loose or slightly consolidated material that washes down in considerable quantities with every rain, giving the surface a corrugated appearance, the sides are still nearly as steep as it is possible for them to be with loose material, and the absence of large accumulations of cinders at the base that can be attributed to wash from its slopes indicates that the cone still retains essentially the form that the extruded material originally assumed.

The Horseshoe is typical in many ways of the younger volcanic cones of northeastern New Mexico. During their early eruptions the lavas seem to have flowed out gently, but the last

THE HORSESHOE MOUNTAIN

Horseshoe Mountain is the crater cone of an extinct volcano consisting at the surface entirely of scoriaceous

eruptions were mildly explosive. Cinders were blown out, but settled close to the crater building up the conical mounds. In some cases small bombs were ejected. Great numbers of bombs 4 to 5 inches in diameter were found in the sides of the Trinchera volcano, but even here the action seems to have been relatively mild for the cinders and bombs are arranged in evenly laminated beds which are steeply inclined in the sides of the cone as indicated in the illustration.

There are no known data by which one can compute in years the time that

has elapsed since the last eruption, but geologically speaking, the formation of the volcanic cones, like Horseshoe and Capulin, was the last event of the region, and although volcanic forces may have been inactive for a hundred years or more, it is quite impossible to know whether the fires are extinct or only slumbering, and as one stands on the rim of a crater and contemplates the result of the titanic forces so recently in operation, one can scarcely escape the gruesome thought that these forces may be only slumbering and may awaken at any moment.

PROTECTING NEW HAMPSHIRE FORESTS

IN its annual report, recently issued, the Society for Protection of New Hampshire Forests tells what it has accomplished in the ten years of its existence. It says:

"The Society takes much satisfaction in the results of its ten years' work. While the problem of saving New Hampshire's forests for their greatest use, by adopting a saner method of harvesting the product, is still largely unsolved, yet we begin the second decade with far more hope and confidence than at the time of organization. We have helped to secure legislation at Washington and at Concord, which gives the forests of the state more nearly adequate fire protection, stimulates reforestation, encourages careful management, and reserves completely some of the places of special attraction. Ten years of educational work has been faithfully done. It is possible to believe that the time may not be far distant when the annual harvest of timber in New Hampshire will not exceed the annual growth, and when large areas of timber, valuable for scenic beauty and for protecting the flow of streams, are permanently safe from ordinary destructive lumbering and from the ravages of soil-consuming fires.

"The reorganization of the State Forestry Commission was one of the first and most important objects. The Society was organized because a few men and women, who met at the call of Gov-

ernor Rollins ten years ago, were not satisfied with the progress of the forestry movement in New Hampshire. With the rapid development of the paper and pulp industry, forests in the mountains were being swept away with no effort within the state to save them. Few realized the importance of saving timber as a source of supply for the future needs of a growing population; fewer believed that the mountain forests could be protected in a manner to prevent the rapid run-off of streams over areas sufficiently large to affect the water-powers and navigation.

"The new Society at once undertook an educational campaign. It employed a forester who spoke at meetings of all kinds throughout the state, showing by photographs and lantern slides the actual conditions, and pointing out what other states were beginning to accomplish. With the appointment of Mr. Robert P. Bass, now Governor, and Mr. Robert E. Faulkner, of Keene, to the Forestry Commission, and with the co-operation of General Tolles, of Nassau, who was already a member, an efficient and progressive administration of the State Forestry Department was brought about. Legislation, advocated by the Society, was passed, securing the appointment of a state forester. The fire laws were rewritten. Co-operation from the Federal Forest Service was secured.

"From its first year the Society ad-



TUCKERMAN'S RAVINE, IN THE PRESIDENTIAL RANGE, WHERE SNOW LINGERS THROUGHOUT THE YEAR. THE FOREST GROWS UP TO THE EDGE OF THE SNOW-BANK. THE SOUTH SLOPES OF THE PRESIDENTIAL RANGE SHOULD BE INCLUDED THIS YEAR IN THE NATIONAL FOREST RESERVE.

Photo by Guy L. Shorey, Gorham.



TOP OF THE CASTELLATED RIDGE, MT. JEFFERSON. THE NORTH SLOPES OF THE PRESIDENTIAL RANGE WILL BE INCLUDED IN THE NATIONAL FOREST.

Photo by Guy L. Shorey, Gortham.



LAKE SOLITUDE. OF GLACIAL ORIGIN, 2,500 FEET ABOVE THE SEA. NEAR THE TOP OF SUNAPEE MOUNTAIN.
ALL OF THE TIMBER AROUND THIS LAKE HAS BEEN PURCHASED.

vocated a National Forest in the White Mountains, and engaged actively in work for this object several months before the Intervale meeting, called by Dr. Edward Everett Hale for the same purpose. Dr. Hale became an honorary life member of the Society, and worked early and late for a National Forest in the White Mountains. It was a sincere regret that his death came before the bill was finally enacted; but his faith foresaw the result, in which he found much satisfaction. The enactment of the Weeks bill, in spite of active opposition from the leaders of both political parties, was a triumph of popular agitation throughout the length and breadth of the country. In this nationwide agitation the Society took a prominent part, as its present wide membership list testifies. The co-operation of the men of the South was particularly gratifying. The governors of the New England States and the Southern States appeared repeatedly together before committees of Congress. The battle was won and the President signed the bill on March 1, 1910.

"Since its formation one object of the Society has been the acquisition of the forest lands by the state and town governments in New Hampshire. The Crawford Notch is one of the famous pieces of scenery in the White Mountain region. When logging operations threatened to disfigure it, the Society proposed that it be acquired by the State of New Hampshire, and a bill was prepared for the legislature. The suggestion was promptly approved by Mr. W. A. Barron, of the Barron & Merrill Company, and the late John Anderson, of Bretton Woods. The Appalachian Mountain Club joined with the Society in an appeal for funds with which to carry on the campaign. A complete and careful survey of the timber in the Notch was made by the Society and maps were drawn. The bill was passed in the session of 1911. Through a clerical oversight it proved defective, and the state is unable to issue the bonds authorized in the bill to buy this property; but owing to the interest and energy of Governor Bass, the difficulties have been partly overcome and the more picturesque portions of the Notch, the northern half, are be-

ing purchased from current state funds.

"In 1909 the residents around Sunapee Lake began a campaign under the leadership of Mr. Herbert Welsh, of Philadelphia, for acquiring the forests on Sunapee Mountain. They invited the co-operation of the Society, which aided in the technical forest work and in the legal work required. Through the efforts of Mr. Welsh, \$8,000 have been subscribed and six hundred and fifty-six acres purchased, covering the entire top of the main mountain, besides the north and south peaks, with the long sky line, and Lake Solitude, a charming body of water, near the top of the main mountain, with the timber around its entire margin. At the request of the contributors the entire property has been placed in the care of the Society as trustee, together with a fund of \$500, covering the expenses of management for a term of years. Now that the purchase has been completed, the contributors seek additional funds with which to clear up the slash and make trails. The Society believes that when the plans adopted are fully developed, Sunapee Mountain will become a most beautiful mountain park.

"The Society made an appeal during the past winter, for sufficient money to accept a gift of the Lost River and one hundred and forty-eight acres of land adjoining it, offered by the Publishers' Paper Company, provided the Society would buy the standing timber upon the tract. This, on careful estimate, was found to amount to \$7,000. By means of a legacy of \$5,000, left by Miss Dora Martin, of Dover, a portion of which became available, together with contributions amounting to \$1,315 from the prominent hotels in the White Mountains, and the remainder from generous contributions on the part of a large number of members and friends of the Society, the gift was accepted, and the timber purchased. Lost River is located seven miles west of North Woodstock. The region is one of great beauty, majestic in its setting and charming in detail.

"For ten years the forester of the Society has been examining woodlands throughout the State, giving advice to the owners on methods of management. Since the reorganization of the For-

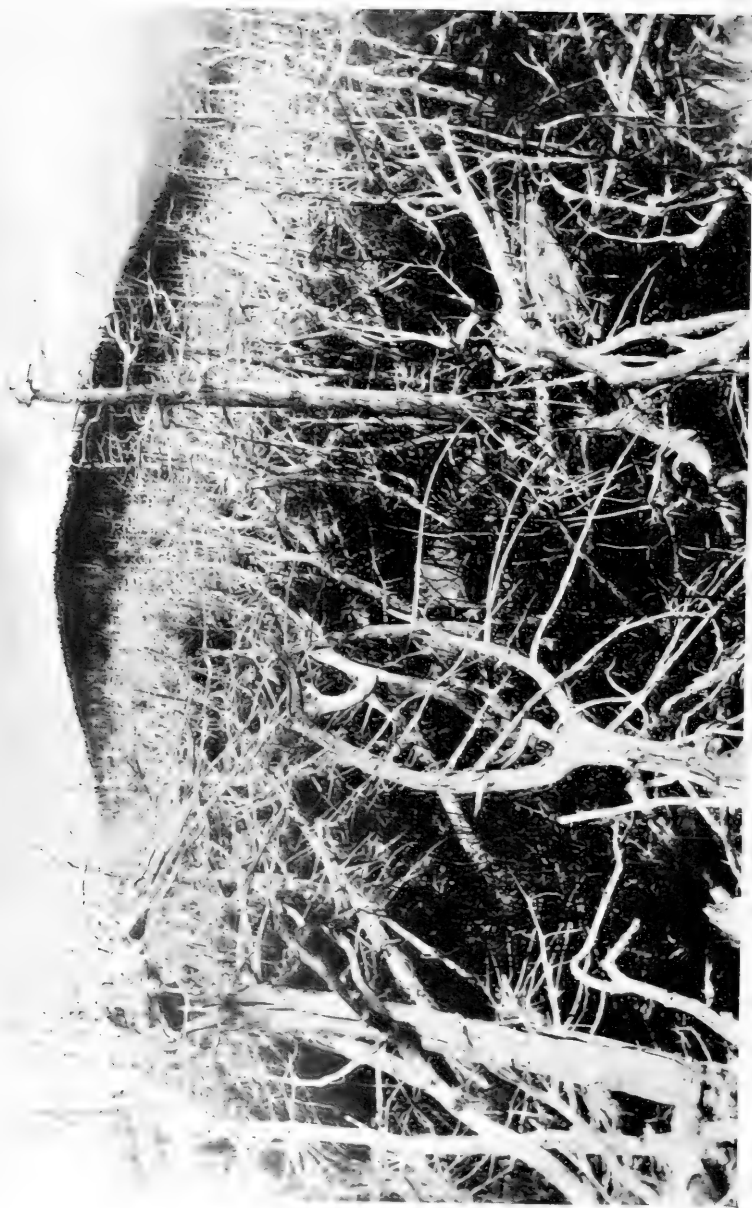


THE CRAWFORD NOTCH. THE UPPER AND MORE PICTURESQUE HALF OF THE NOTCH IS BEING PURCHASED FOR THE STATE OF NEW HAMPSHIRE BY THE GOVERNOR AND COUNCIL, NOTWITHSTANDING THE DEFECT IN THE LEGISLATIVE BILL.

Photo by Kitchin, Littleton.

LOST RIVER IN WINTER. AT THIS POINT THE STREAM ENTERS THE CAVERN.





AFTER FIRE ON THE PRESIDENTIAL RANGE. FIRE SWEEPED UP FROM LOGGING OPERATIONS BELOW THAT WERE NOT PROPERLY GUARDED.

Photo by Guy L. Shorcy, Gorham.



PRIMEVAL SPRUCE TIMBER ON MT. WEBSTER. A PART OF THE NEW HAMPSHIRE STATE PURCHASE IN THE CRAWFORD NOTCH.

Photo by William R. Pehrman, Dublin.



PARADISE FALLS, LOST RIVER. AT THIS POINT THE STREAM EMERGES, PLUNGES THIRTY FEET, AND ENTERS ANOTHER REMARKABLE SERIES OF CAVERNS BELOW.

estry Commission, the state forester and his assistants have been doing the same. During the past year two additional foresters, one employed by the Timberland Owners' Association and another by the State College at Durham, have taken part. This means that a very large aggregate of timbered land is managed with a view to a better crop instead of in a haphazard manner. With the advance in the price of timber, owners have realized that the advice given is valuable in helping them to produce better material and avail themselves of better markets.

"From the start the Society has realized that a fundamental change in public sentiment, through the education of the people as a whole, is a necessity if it would accomplish its desired results in a substantial manner. To improve the forests of the state requires a long continued public interest, which can only be secured by thorough knowledge on the part of a large number of

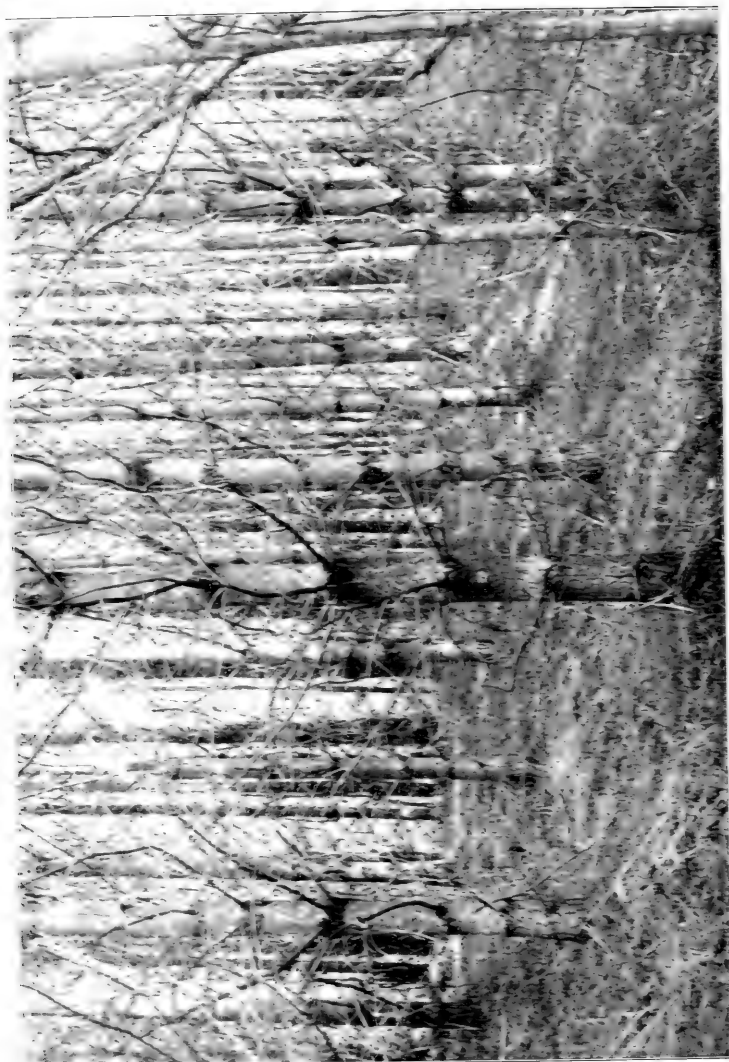
citizens. The Society is happy upon having on the statute book at this time every one of the important legislative measures which it undertook at the time of its organization.

"At this time there are four reservations in the hands of the State Forestry Commission in addition to the Crawford Notch purchase. There are two in the care of the Society, the Sunapee and Lost River tracts. These are in addition to seven reservations in the care of the Appalachian Mountain Club, for which the Society is not responsible. Several beautiful forests in the state are owned by individuals, and held free and open to the public use. Striking examples of these are the forests purchased and held for public use by Mrs. B. P. Cheney in Peterborough, Mr. Daniel C. Remick in Littleton, and the beautiful pine woods on the road between Bethlehem and Franconia, held for public use by Miss Sarah H. Crocker, of Boston."



PINE WOODS IN KEENE. \$64.00 PER ACRE LEFT STANDING TO GROW.
\$48.00 PER ACRE (NET) HAS BEEN THINNED OUT.

Photograph from U. S. Forest Service.



PINES PLANTED TWENTY FEET APART, FIVE FEET APART EACH WAY, WHICH IS THE BEST SPACING. THINNINGS NOW HAVE COMMERCIAL VALUE.

Photo by E. H. Hayward, Kennebec.

THE LOGGING ENGINEER IN THE PACIFIC NORTHWEST

By A LOGGING ENGINEER

SINCE entering my trade rather than Government or State employ, I have received quite a number of letters from prospective foresters asking for information as to just what opportunities were offered a technical man with private logging and timber companies in this section of the country. The purpose of this article will be to set forth very frankly the advantages and drawbacks of such employment; the ultimate reward to which he may look forward, if successful, and the special preparation needed for this particular line of work.

In the Pacific Northwest we are not yet to that stage of development in which our timbermen and millowners can see the end of their resources in the near future and are sufficiently jarred by the prospect into taking steps to provide for a perpetual timber yield. As a matter of fact we cannot even approximately utilize our present waste. We are simply in the position of Wisconsin and Minnesota in the 90's with the important exception that our business men are wiser from past experience and the most of them more than willing to take any necessary steps to avoid the serious consequences of an exhaustion of our timber supply, provided they can get together, as to ways and means, and can be shown that dollars invested now will at least earn their 5 per cent a year. That we are progressing along the right lines is shown by our forest fire laws and their effective enforcement, and by the very able work done by Mr. E. T. Allen, forester for the combined timber and fire associations of our Northwestern States. So far this work has been mostly educational and tending toward the enactment of such laws as will enable the work of providing for future generations to be put on a sound and profitable basis.

I would like to call attention to one fundamental difference in the situation

of these Northwestern States to day, and that of Wisconsin and Minnesota in a like stage of their timber development, namely, the great national forests occupying the greater part of our mountainous country, which will not only serve as an example of practical conservation, but furnish a very considerable source of permanent timber supply around which, and modeled on which, we can maintain our large private holdings of the future.

While these foregoing paragraphs may seem quite a digression from my subject, they are necessary to an intelligent understanding of the field in which the labor of the future logging engineer is to be spent. It is so easy for the young forester, fresh from his studies of the latest and most advanced methods, to make the mistake of condemning local methods before fully understanding the underlying principles and conditions which may justify these seemingly incorrect and wasteful ways of going at things. Let him first ask himself "Why," and after thoroughly threshing it out he will be in a better position to suggest changes.

First and foremost, you must specialize on the importance of the logging railroad. The railroad is the main artery of the modern logging plant, and, aside from the timber itself, it is the most important consideration in planning for a logging operation.

Under this head comes your topography taken in connection with a thorough reconnaissance of the entire tract. You will have very little use for triangulation or traverse methods in this first preliminary examination. The general mapping will be done by pacing and the use of the aneroid, with checks on the section and quarter section corners. All section lines should be run out and reblazed and the mapping done by the contour method using from 20 to 50 foot contours, depending on the relief of the country, and accuracy required.



SIMPSON LOGGING CO.'S BRIDGE IN CONSTRUCTION STAGE. BEGINNING OF FOOT-HILLS OF THE OLYMPICS.

Once you get your country mapped you have a splendid basis from which to work on the preliminary reconnaissance for the railroads. It usually pays well to go over as closely as possible the route to be taken by the road and get thoroughly familiar with the topographic details that will control the future road. For instance, suppose, after you have gone a mile or so, following a tentative grade of, say 2 per cent, you will find that by increasing your grade one-half foot to the hundred you can gain a bench, which will give much lighter construction for a considerable distance. This will be a vital control in the laying out of the road, either necessitating an increase in grade, or a new starting point for your climb. In general, the whole line must be laid out in reference to the points of chief difficulty or where the greatest saving can be made in cost of construction without impairing the value of the road as an outlet for the timber. The latter point is one which must never be lost sight of.

You must thoroughly understand logging to successfully construct logging roads. It is just here that the contracting surveyor or engineer falls down. His ideal is the road itself. Yours must be the logging operation as a whole. Your cost must be governed by the amount of timber to come over the road and the probable expense of logging it. When possibly you will want to limit yourself to a 16-degree curve and a 3 per cent grade on main lines, but quite often you will have to depart from these limits and will be entirely justified in doing so.

Having threshed out the main line, you are ready for the preliminary survey, and I want to say right here that out in this country the day when railroads could be laid out by eye, and with curves run in with a tape, is past. It is real railroad engineering; a transit should be used on main lines, while a good compass and hand level will serve very well for the spurs. You must be able to give a pretty close estimate on each mile of proposed construction



STEAM SHOVEL AT WORK ON NEW EXTENSION, SIMPSON LOGGING CO.'S R. R. AT SHELTON, WASH. CONSTRUCTION OUTFIT OWNED AND OPERATED BY THE LOGGING COMPANY.

from cross sections of the excavations and fills, including drains, culverts, trestles, bridges and equipment. We have a number of logging bridges over 100 feet high and from 600 to 1,000 feet long in this State and every year as the logging gets further back into the foothills, the longer and more permanent are the main lines of the logging railroads.

You may find several preliminary "fly lines" necessary in the very difficult places before the final location can be determined. The preliminary lines are platted in the office, usually by "latitudes and departures," and from your cross section topography, the final location can be sketched in, subject to further changes on the ground, if necessary.

The spurs are laid out much in the same manner, economy, however, being the main consideration. You can afford to haul over a 6 per cent grade and 32 degree curve for a few months on

spurs where two or three loads can be switched out at a time. In most instances a light locomotive, geared or direct connected, is kept especially for switching from the landings on the spurs to the main line side track.

Then there is the maintenance to be supervised, and a close watch kept on construction. At the end of each year you will have a detailed report on the railroad work, cost of engineering, construction and maintenance, cost per M. for timber coming out over each spur, and cost per M. over the main line.

Another duty will be the laying out of pole and skid roads when necessary. Together with the spur work this should be done with the co-operation and help of the logging foreman. Your idea must always be to facilitate his work in the actual logging operation as much as possible, and you must be aware of his future plans, governing your work accordingly.

As a general rule you will co-operate with the foreman and superintendent in



BRIDGE OVER WEST FORK OF TATSOP RIVER, 130 FEET ABOVE THE RIVER. WITHIN ONE MILE ON THIS SAME ROAD IS THE TWIN OF THE BRIDGE. IT IS ESTIMATED THAT THE LAST $1\frac{1}{2}$ MILES OF THIS ROAD, INCLUDING THESE BRIDGES, COST NEARLY \$100,000 TO PUT INTO OPERATION. IT IS STRICTLY A LOGGING ROAD. SIMPSON LOGGING CO., SHELTON, WASH.

selecting camp sites and in locating landings. At the landing there should be enough grade toward the main track to drop the loaded cars by gravity and yet not too much grade, as that would make this proceeding dangerous. It is very easy to let a loaded car get away on a grade, and even where proper precautions are taken as to safety switches and derailing devices a great deal of damage may be done by such a run away.

While much more might be said on this subject, to go into further detail would more likely prove confusing rather than enlightening. So I will leave the other phases of the work which doubtless will probably come in contact with the reader.

Perhaps, next to the purely engineering side of your work will come fire protection. It is quite true that the greater part of this country is patrolled more or less thoroughly by one of the

fire protective associations. But in nearly every instance the effectiveness of their patrol depends almost entirely on the co-operation of the logging companies. And nine times out of ten the actual handling of any fire on your lands will devolve on you. Hence, the necessity of adequate preventative measures, such as the burning of slash, clearing up of the railroad right of way, construction of fire trails, and organization of the logging force so that at a moment's notice it may be converted into an efficient fire fighting body with proper equipment, ready for use. In this one particular alone the logging companies of this section have perhaps more room for improvement than in any other branch of their organization. I sincerely believe that enough property, camps, logs, donkey sleds, etc., together with the often misplaced energies of a typical logging crew fighting fire, would fully meet the expense

of such an organization for fire protection within a short period of years, not to mention the practical insurance against loss from fire that such systemization would constitute.

The timber end of the work is by no means unimportant. There will be quite a large amount of cruising and scaling to do, and I wish to state most emphatically that a man new to this country needs several years experience in timber before he can constitute himself a competent judge. Different localities have their own characteristics: in mixture of species, variations of growth conditions, marketability and special conditions, such as the prevalence of pin-knots, pitch-pockets or coach.

Any questions of subdivision or sections or of trespass will come under your duties. The accurate scaling of trespass from the stumps is quite an art of itself, and many of the larger timber holders employ men who give practically their whole time to watching for trespass.

At the close of each year's work, in connection with the railroad report would be a report on the year's logging, showing the area cut by each camp, the average yield per acre, and the average cost of logging per M by the month. Also the cost of timber left on fractional forty's. This would give the owners of the company an idea of how their cruises were panning out and how much timber was still left tributary to the camps in their present location.

Another problem you will want to be up on is the final utilization of the logged over lands. Will it pay to reforest? If so, what method will be best suited to the land in question? If not, what will it cost to clear and subdivide into small farms? Can you successfully clear by the charpit method, or will it have to be done with dynamite and a donkey engine. In short, the question of our logged off lands is as important to this section of the country as is irrigation to the arid lands of the West or the drainage of swamp lands to the South, and the man who can present and work out a satisfactory solution

to this problem is going to be one of the "big" men of this section. And it is by no means an unsolvable question.

I have laid out townsite additions and drafted plans for a hospital; estimated power generated by our mountain streams and surveyed mining claims. In fact, the diversity of the work and the continual game of working out new problems (for no two logging propositions require the same treatment) is one of the biggest attractions in this sort of work. And it takes a good man and a versatile man to succeed. There is not a large logging company in the country that does not need such a man. They may not all realize their need, but it is there just the same. And there is no better training in the world for a first class woods superintendent. Add to that the fact that really "A Number One" woods superintendents are not readily picked up these days and you have the ultimate answer. Make yourself valuable enough to your company to demand an interest or else have the ability and knowledge to put in with capital in the development of an operation of your own.

This does not sound much like forestry, does it? But after all, what is forestry but scientific management and operation of timber lands? And if State laws and local market conditions make it impossible to either hold your timber or to utilize it completely, is it not good forestry to operate to the best possible advantage under present conditions and in the meantime try to better the conditions? Of course we can better our methods now, and year by year in the future, but we cannot do it all at once, and the more technical men who become associated with the actual logging and manufacture of timber, who will work toward the end of practical conservation, the sooner we are going to get such conservation. And who can foretell what the next two decades will bring forth in the line of real forestry. I for one will not be surprised to see large companies in this western country who, operating under wise tax and fire protection laws, will



DOUGLAS FIR LOG, TEN FEET SIX INCHES INSIDE BARK. LOGGED AT CAMP 5, TWIN FALLS LOGGING CO., CLARK COUNTY, WASHINGTON.

own tracts large enough to give their mills a perpetual supply of logs. And when that time comes, it will be the forester working from the inside of the actual operation who will know best what may and may not be attempted.

But it means work and more than that—drudgery, especially to a college graduate whose pride is going to be hurt more than once while he is doing subordinate work, often under men who, lacking education, affect to look upon any one who has been a “college boy” as no good when it comes to real work. You will often find yourself regarded as a failure simply because you

are working up in a big business; and that by men who have had some one to pull and push a bit for them when they started on their business career. I thoroughly believe that this is one business that has to be learned by actually getting in and working at the various subordinate jobs that go to make up the whole of a really big business. Our best loggers are men who have worked since they were boys, and they will tell you that they are always learning some new wrinkle. I know from experience that this is very true. No two logging companies operate under the same principles; some have a good selling organ-

ization and fall down on the actual logging; others have a splendid railroad system and do not seem to get the logs; one man is logging small timber, another large timber, one in ragged country, another on comparatively level land. Everywhere you turn there is something different and there is no business in the world where the individual efforts of the superintendent or manager count for more in the general result attained.

There will be many times when you will ask yourself whether or not you have made a mistake after all in taking up private rather than Government or State work. You see your classmates going ahead more rapidly at the start than you can hope to do. They receive more money to start with and are promoted more rapidly the first year or so; and here is the biggest question of all; they are doing more technical work, are using their education, while you are way back in the primary grade again learning your "A, B, C's" of the business. This is the hardest rub of all and I believe it influences more men to go into the Government service than any other one thing. But just wait a

little longer and I'll tell you about the rewards, as I begin to see them. Whenever I began to get discouraged during the first few years I used to remember the words of a man who had done both private and government work, and who knew what he was talking about. He said, "Ten years may seem a long time to a young fellow, but to a big corporation, training men for the work of a life time, it is but a short and necessary period of preparation." Now I do not expect to have to put in ten years of drudgery. I can begin to see the end of it now. Why? Simply because I am getting to know the business from the ground up and I know that I know it. This knowledge is going to be capitalized before long and it is worth just what I have spent on it. And meanwhile, I have made a living for myself and family; not much, but enough. I have good friends and the respect of those with whom I am thrown in contact. And I would not trade my chances for the future with any one of those who entered the business handicap at the same time and with the same equipment I had.

STATE FIGHT ON TREE PESTS

ABOUT four weeks, starting May 13, is being devoted by Pennsylvania to demonstrating methods for the control of the codling moth, cucurlio and other insect pests which have started to get busy on the fruit trees which are in blossom.

Dr. H. A. Surface, the State's zoologist, says that the demonstrations will be held in twenty counties the first week and in thirty-five counties the second, the northern counties being in the third week, as the time to demonstrate the methods for control of the pests is just after the petals of the blossoms fall.

"Several meetings are to be held in

each county," says the zoologist. "This is so that everyone will get a chance to see the demonstrations which will be in charge of our best men. This is the time to get after the codling moth, the chewing insects and pests which are now infesting trees in some parts of the State or are likely to develop. Pennsylvania has advanced the value of its fruit crop wonderfully by using scientific methods in the combatting tree pests, and it is believed that as soon as fruit tree owners realize the possibility of reducing the number of culls or unsound fruit from ten per cent to two per cent. I think there will be still greater gains."

FOREST CONDITIONS IN WESTERN NORTH CAROLINA

By J. S. HOLMES
Forester

IT IS probable that Western North Carolina is more widely known for its fine climate, pure water, and beautiful scenery than for any others of its natural advantages. Thousands of health and pleasure seekers come each winter to this "Land of the Sky" to escape the rigors of the northern and eastern states, while tens of thousands flock each summer from the south. The entertainment of these summer and winter visitors or tourists forms a most important and promising industry, for they bring into the country each year from two and a half to three million dollars. The large part that the forests play in the tourist traffic, by increasing the purity of the streams and making the country more beautiful and interesting, is not generally realized; yet forest and stream and climate are Western North Carolina's most valuable assets. With the conservation of the forests, the improvement of the roads, and the extension of railroads, the attractiveness as well as the accessibility of the country will be tremendously enhanced, and the number of visitors will steadily increase.

Of even greater economic importance are the timber resources. The hardwoods of the Southern Appalachians are as widely known among buyers and users of wood products as the climatic advantages are by the traveling public. Oak, chestnut, poplar, cherry, walnut, and other woods are shipped to all of the eastern states, even to Canada and to Europe; and furniture made in North Carolina from wood grown in these mountains goes all over the world.

Agriculture, which in most parts of the State stands first among the industries, takes third place in the mountains, and, if only those farm products which bring a cash return are counted, is unimportant, though considerable quantities of apples and cabbages are shipped out of the region,

and corn, cattle, chickens, eggs, butter, fruit, and garden truck are sold locally.

ACCESSIBILITY OF THE TIMBER.

The accessibility of timber largely determines its value and also determines methods of forest management.

Western North Carolina is well supplied with railroads, there being no fewer than ten railroad outlets. Yet the greater part of the best timber is remote from transportation and cannot be marketed profitably until new lines are built or extensions made. Since 1909, however, railroad development has been rapid, so that now only the three extreme northeastern counties are without railroads, while spurs or extensions are under construction or are definitely planned for about half the mountain counties. The wagon roads, which are the chief feeders for the railroads, are in most cases unimproved; and though they are often fairly good in dry summer weather, many of them become almost impassable in winter. Nothing could add more to the value of timber and give proper encouragement to proper methods of forestry than the construction of good roads. This question of transportation is discussed in more detail later.

CLASSIFICATION OF LAND

Throughout the region, agricultural land is held mostly in small areas, and a farm of more than 500 acres is exceptional. In nearly all counties, however, some forest land is held in large bodies by lumber companies, or speculators; and in some counties more than 60 per cent of the land is in tracts of more than 1,000 acres in extent. But since all of this is rough, mountain woodland, unsuited to agriculture, such tenure is no drawback, but rather an advantage; for by keeping the full stand of timber the land retains a full valuation, which is reduced as soon as the timber is taken off.



LOGGING WHITE PINE AND HEMLOCK, MITCHELL COUNTY.

The proportion of cleared to forested land varies considerably in the different counties, depending on the transportation facilities and suitability for farming. In the region as a whole about 24 per cent of the land has at one time been cleared. While most of this land still produces agricultural crops, a good deal of it in some counties has been "thrown out," or abandoned, because it is too poor and too much washed for profitable cultivation. Such land usually produces worthless briars and bushes or in some cases reverts to a scattered growth of oldfield pine or hardwood of little present or prospective value.

THE FOREST CONDITIONS

The forests of this region are largely confined to absolute forest land, that is, land potentially more valuable for forest growth than for anything else. The forest may best serve for the production of timber, or it may be required

mainly to prevent erosion or to protect and regulate a water supply. In the main, the mountains are so steep and the soil is so shallow that the removal of the forest cover and the cultivation of the land are followed in a comparatively few years by the washing away of the fine surface soil and the abandonment of the land for agricultural purposes. Not only have practically all of the areas suitable for agriculture been cleared—including the bottoms along the streams, gently rolling plateau land and hilltops, the lower gradual slopes, and the mountain cover—but much absolute forest land has also been cleared. It used to be that farmers cleared a "new ground" each year, and abandoned to "old fields" an equivalent of "worn out" land. This practice is now giving place to improved methods by which the cleared land is kept in good condition. Though much land has been cleared for agri-



TYPICAL HARDWOOD FOREST OF WESTERN NORTH CAROLINA. VIEW FROM HUGHES' RIDGE, SWAIN COUNTY.



BINDING POPLAR BOARDS FOR EXPORT, SWAIN COUNTY.

culture, some of which is now reverting to forest, 76 per cent of this region is forested, or a little more than three million acres in the 16 counties.

PRESENT STAND

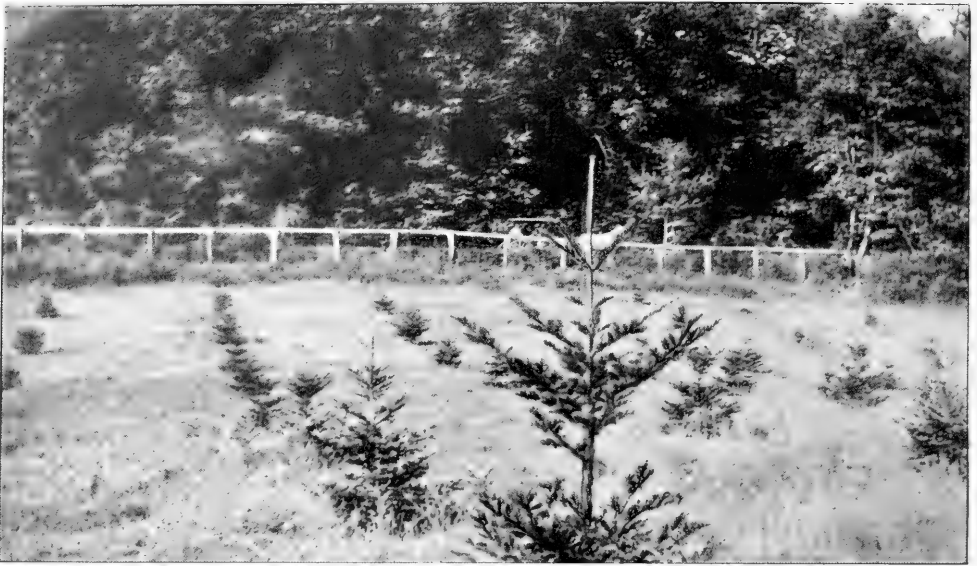
The greater part of the forest has been reduced to cull stands of comparatively small and second class timber. Only two or three counties have virgin forests of any considerable extent, and these are mostly controlled by large lumber firms. Table 1 shows the relative amount of forest in each county, by areas and by species. About eleven billion feet of timber in trees 10 inches and over in diameter breasthigh remains; this is equivalent to an average stand of a little more than 3,000 board feet for every acre of forest land. The larger part of the forested area, however, has less than this, as shown on the accompanying forest map.

ANNUAL OUTPUT

The lumber cut for the entire State, which had been gradually rising, amounted to more than 1,622 million feet in 1907, but because of business de-

pression declined 30 per cent in 1908. In 1909 North Carolina jumped to fourth place, from thirteenth in 1908, with a cut of 2,177,715,000 board feet.

It is estimated that uncared-for hardwood forests, such as those in Western North Carolina, are growing at the rate of from 12 to 15 cubic feet per acre per year. Assuming even that the greater figure represents the annual growth in this region, then the timber is being cut much faster than it is growing. This can not last indefinitely. Either the annual cut must be reduced to coincide with the growth, or else the growth must be made to keep pace with the demands upon it. The latter is certainly the most economical and businesslike way of dealing with the problem. By protecting these forests from fire, and by encouraging the more rapid-growing and more valuable species, the annual yield of timber per acre can be largely increased in a comparatively short time. The large furniture and related industries in Piedmont, North Carolina, which now draw the greater part of their timber supplies from the region in which they are situated, will



THRIFTY GROWTH OF BALSAM PLANTATION, AT ELEVATION OF 3,800 FEET, WATAUGA COUNTY.

depend more and more on the mountain forests. The demand for this material, aided by improved transportation facilities and methods of manufacture, should make it evident that the establishment of a maximum timber yield would constitute one of the most important contributions which the mountain counties could make toward the economic development of the State as a whole.

FOREST DISTRIBUTION BY TYPES

The forests of Western North Carolina are a part of the great Appalachian hardwood region, which extends from southern New England to the mountainous portions of northern Georgia and Alabama. These forests differ from those of the central hardwood region, into which they gradually merge beyond the western border of this State, in their possession of several important species which do not grow beyond the mountains, or grow in very small quantities. Such species as chestnut, red hemlock, and white pine form a large proportion of the Appalachian forests, and scarcely appear in those of the central hardwood region.

There are two distinct classes of forests in this region; the spruce forest on

the tops of the highest mountains, and the hardwood forest, either pure or associated with pine. On some mountain slopes hemlock grows in almost pure stands, and some old fields at the lower elevations have grown up to pure or mixed stands of pine; with these exceptions the hardwood stand covers the whole area.

SPRUCE FOREST

The spruce forest grows only on the tops and upper slopes of the high mountains, and rarely below an average elevation of 5,500 feet. This forest is an extension of the great spruce forest of the North, which seeks increasingly higher altitudes as it extends south, and reaches its southern limit on the western shoulders of Clingman's Dome, a peak 6,600 feet high, in Swain County. The largest spruce areas in this region, as will be seen by the map, occur in Swain, Jackson, Haywood, Yancey and Mitchell counties. The distribution of the type is dependent not only upon elevation but also upon moisture conditions and to a large extent on protection from storms by the surrounding mountain peaks. The type extends down only a short distance on the southern slopes of even



MATURE SPRUCE FOREST SHOWING ADEQUATE REPRODUCTION.



MATURE SPRUCE FOREST BURNT OVER AND DESTROYED TWELVE YEARS AGO.



SPRUCE PULPWOOD, FROM FLUME TO CARS.



CHESTNUT EXTRACT WOOD IN YARD OF CHEROKEE TANNING EXTRACT CO., ANDREWS.



UNLOADING BARK FROM CARS AND STORING IN SHED.

the highest mountains, but along northerly ridges and slopes it sometimes descends to 4,500 feet.

The stand of spruce and balsam averages from 15 to 25 thousand feet an acre over the whole area covered by this type, and many stands will cut from 40 to 50 thousand feet to the acre. Where this timber is being cut for pulp wood from 40 to 50 cords per acre is an average yield. Spruce varies in height from 40 to 50 feet on the ridges to 80 or 90 feet on the north slopes and in the heads of coves, where it attains a diameter of three feet. Balsam is smaller and is rarely more than two feet in diameter.

In the mature forest reproduction is good, owing to the very favorable moisture conditions and the freedom from fire. In dense stands there is a larger percentage of balsam, but where the forest is more open spruce reproduction is favored. On areas that have been cut over and not burnt, the young growth which had started before cutting continues to thrive, and on many areas seedlings of both species have started since cutting. Unfortunately, no very heavy cuttings could be studied, since logging for pulp wood has been carried on for only two or three years. Both spruce and balsam need moist humus for successful reproduction, and

where fire recurs after cutting neither of these species will be perpetuated. The abundant rainfall, which is heavier on these mountain tops than anywhere else in the State, assisted by the dense shade of these evergreen trees, affords an efficient fire protection for spruce forests while they remain largely in their natural state. But when the trees are removed, allowing the large amount of vegetable matter on the soil and the tree tops left in logging to become dry, fires burn through the remaining timber with disastrous results. The current belief is that it is impossible to keep fires out of this type after logging, and that then these forests will disappear. If fires can not be kept out, this will certainly be the case, and all this type, amounting to some 100,000 to 150,000 acres of splendid forest land, will very rapidly become barren mountain tops. On certain areas that have already been cut and accidentally burned, grass has been sown, the owners claiming that the land will pay better in pasture than in timber. There are, however, only limited areas that are suitable for pasture, and most of the land is so steep and so rocky that once the dense forest cover is destroyed the soil will soon wash away and leave only the bare rocks. In the opinion of well-informed men, if this happens the land will event-



A LARGE CROP. STACKING SURPLUS BARK IN THE OPEN.

ually revert to the State for unpaid taxes.

The hardwood forests, which occupy all but the highest peaks, vary considerably, according to soil, aspect and elevation. They can be separated into four important types: plateau, chestnut, red oak, beech and maple.

THE TIMBER INDUSTRIES

Practically all of the timber cut in Western North Carolina is sawed or

otherwise manufactured in that part of the State; little is shipped out in the log. Two-fifths of all the timber cut for sale is manufactured into lumber; but the greater part of this is shipped out of the region.

Except for agriculture, almost all of the products of which are consumed locally, lumbering is by far the most important industry. In 1909 about 185,000,000 feet of lumber brought a money return of nearly \$3,000,000.

INCREASE FOR NEW HAMPSHIRE

State Forester Edgar C. Hirst has been notified by the forestry department in Washington that the government will again this year co-operate with the State authorities in protecting the forest lands of the north country from damage or destruction by fire, and that the sum of \$8,000 has been allotted to the State, as against \$7,200 last year.

REFORESTATION STARTED

The board of water commissioners of Massachusetts decided to undertake the experiment of reforestation of the Little river and Ludlow watersheds, and in pursuance of that idea voted to buy 10,000 young pine trees for planting on the two watersheds. The work will be started within two or three weeks, 5,000 of the trees being set out on each watershed.

TREES OF INDIANA

The Indiana State Board of Forestry, in response to a demand from teachers, pupils, landowner, and millmen for information on the trees of Indiana and their uses, have devoted the greater part of their 1911 report, which has just been published, to this subject. This report illustrates each species of forest trees of the State, with a full-page drawing, and gives a detailed botanical description of each species with its distribution in the State. The economic uses of the different kinds of wood are given, together with a table showing the comparative weight of the different woods. The horticultural and forestal values of many species are discussed in detail, and information is given as to the best kind of trees to plant for ornamental and forestal purposes.

A LUCKY CHANCE ASSIGNMENT

By WALTER J. MORRILL

IN the summer of 1908 we were worn out with forest fires on the Pike. They came in bunches. One of the worst was on Elk Creek.

A new guard, Joseph E. Smith, was the first to report it to our headquarters in Denver. He had frazzled nerves acquired in his capacity as city editor on a Denver paper, which was fighting us at that time. He needed outdoor employment for a season, and we sorely needed on that newspaper staff some one with a little first-hand knowledge. Moreover, few were applying for positions. He was a good fellow, the acme of urbanity, and the quadruple extract of politeness. Yet we thought it wise to fill his days with arduous labor, while we trusted that his natural instinct would lead him to employ his evenings in literary work. Accordingly, he was assigned a reasonably long patrol in dry weather, and on rainy days he was given a trail to build. His principal equipment consisted of an ax, shovel, and a quantity of yellow scratch paper.

Within a few days there came from him a long distance message: "A horrible big fire on Elk Creek." Was this some newspaper scare line stuff? I left for Bailly's on the next train; recruited all the available native force; took another glance at the billowing smoke 12 miles north, and telephoned the Supervisor for 30 men from the Denver.

We fought against odds that night. It seemed at first as fruitless as old King Canute's endeavor to stop the ocean tide, but finally we held the line on one side. Then help came, and with it two Forest Assistants to serve as my lieutenants. Two more days of rounding in and holding the fire followed. By this time the editor-guard was exhausted. He had served well as a mounted aid to carry messages from different portions of our front. We now had the fight well in hand.

It occurred to me to assign the guard to the comparatively easy task of scouting the district from a divide. It was possible that other fires might start in distant places in that wild region. In the forenoon he set out with a young ranchman on this seemingly unimportant mission. The divide was two miles or more to the right of our surrounding fire; its ascent was rough.

An hour later the unexpected, the disastrous thing happened. The wind shifted and became rapidly stronger until it was violent. Smouldering snags burst into flames; embers carried across our north line. After one low branching spruce had flared with a roar, and then another, soon a crown fire was racing up the gulch, preceded by swiftly flowing low clouds of dingy smoke. Up the canyon the flames ascended with incredible speed, as fire sweeps up a soot-filled smoke stack or the chimney of a foundry. Since the guard and the ranchman should be well on their way, perhaps they could reach timber line. So we rearranged our forces on each side of the canyon along the high walls. We could not head it. Valuable timber on either side stretched away for miles. The gulch must burn, but we hoped to confine the fire to it.

I felt no small anxiety concerning the two men. Occasionally I ascended to a rocky point, but at no time did I see them. Nor was it likely that I could, since the distance was considerable, and at times the smoke obscured. I looked nervously for smoke columns on the other side of the divide, although I doubted whether brands could carry to the adjoining watershed.

A sleepless night of worry and patrol inspection followed. My thoughts dwelt upon the task that I feared would be mine on the morrow, when the gulch could be traveled. Daylight came, and I went to camp. The night men had come in for a few hours'

sleep. Nobody had seen the missing men. My fears seemed realized. Little was said, and a funereal atmosphere prevailed.

Could I believe my bloodshot eyes! Yes, there were the guard and the ranchman, black-faced like minstrels, crippled like old stage horses, struggling into camp. The case-hardened old reprobates of my cursing, tired, faithful crew from the "lower precincts" broke into a spontaneous cheer. A lump obstructed my throat, and I merely grasped the two by their hands and led them to the camp stove for their coffee.

The guard finally recounted their experiences. First the eddying smoke and the increasing wind had aroused their apprehension. Then the roar of the oncoming crown fire had spurred them forward. As the walls of the canyon did not permit of escape to either side, their only chance lay in gaining timber line ahead, a distance only vaguely known by either. Up they clambered. A sense of anxiety soon took the place of the first spirit of adventure, as violent exertion brought them distress, and the smoke was increasingly irritating. Soon a louder roar and crackling convinced them that the fire was overtaking them. The way was steep and boulder strewn, the smoke choking. Fright urged them on. The red glared dully down the gulch through black smoke; the heat was already appreciable. Gasping, terrified, and exhausted they wildly, but more feebly, stumbled forward. The smoke was blinding them now. Flying embers and pieces of burning bark shot past them, and burned holes in their clothing. Then, when hope was all but gone, a bunch of scrub willow was in their path, and then another. Rank grass appeared. The ranchman shouted encouragement, for to his experienced eye these were evidences that timber line was gained. Now they were in dense, scrub willows that scarcely reached waist height. On and up they slowly faltered, but safe. Relaxation overcame them, and a nervous reaction caused them to jest about their

recent plight. But soon sprains and bruises, previously unnoticed, began to appeal. Thirst was parching their throats.

By brief advances they gained the crest. A lurid spectacle appeared below—a world afire. Embers still whirled past them. Could the flaming missiles possibly touch off the heavy spruce on the Bear Creek side? Duty demanded an immediate inquiry. Down the other side they painfully made their way. A tiny column of thin blue smoke greeted them here, and another there. Again they were running, their infirmities forgotten, but toward the fires. They beat out the flames here, only to find themselves more urgently needed elsewhere. With bleeding hands they scraped earth to throw on resin-filled, burning snags. Flames were curling up from the needle-littered forest floor, spreading like the ripples from a stone thrown into a placid lake. Sometimes it seemed that only two were no match for the insidious blazes. Once the ranchman fainted. He was dragged from danger and revived. Again the two men wrestled with odds against them. For hours they fought. It seemed to them their whole life time had been spent in fighting the flames. Burning thirst, physical and mental exhaustion were always present, but not one moment of respite.

Indomitable will and perseverance, however, were beginning to tell. No longer did the battle seem hopeless, for they were surely succeeding, and the prospects of victory inspired them to renewed exertions. The day passed, and night ushered in a calm. Finally one could hold the line of defense, yet with some danger, while the other went in search of water down the forest-clad slope, returned and relieved his companion. Hunger, faintness, and fatigue held vigil with the two as they made their incessant rounds, for no foe is so crafty as a forest fire.

Long after midnight, when all seemed secure, they painfully climbed the crest. Far down the canyon that they had traveled long, long ago there

gleamed a myriad of isolated fires, like camp fires of an army. But the fire zone was narrow. It was evident that the crew had held it to the canyon. Soon the pale gray of approaching dawn appeared over Meridian Hill. A little later they could safely trust themselves on the crags; and then came the

slow, weary march by a long detour to camp.

Thus ended the crisis in that fight, won by the two on a lucky chance assignment. And now no newspaper writer more ably defends the Service than the former guard. He has seen, and he knows.

FORESTS AND FLOOD PREVENTION

THE report of the United States Waterways Commission, recently made public, devotes ten pages to a review of the conflicting opinions, statements and reports upon the influence of forests upon navigation and flood prevention.

The Commission says that the officers of the Corps of Engineers and meteorologists are, as a rule, inclined to minimize the influence of forests upon rainfall and stream flow, while geologists, foresters and others are inclined to emphasize it and civilian engineers are about equally divided.

The Commission reviews the investigations made by Prof. Mead, of the University of Wisconsin, and those of Colonel Burr, of the Corps of Engineers, both of which showed that no particular variation in stream flow could be traced to the large changes in forest cover which have taken place in certain drainage basins. It also reviews the studies made by M. O. Leighton, of the Geological Survey, and Messrs. Hall and Maxwell, of the Forest Service, tending to show that a number of streams in the eastern United States were becoming more irregular in their flow. The Commission rejects all these records, however, as not finally settling the question.

The final conclusion reached by the Commission is that whatever influence forests may exert upon precipitation, run-off and erosion, it will evidently be greatest in mountainous regions. In no case, however, can forests be relied upon to prevent either floods or low-water conditions. There is substantial agreement of all the witnesses on this point.

The prevention of erosion undoubtedly outweighs all other benefits of forestation, and the Commission favors the prevention of forest removal on mountain slopes wherever the land is unsuitable for agricultural purposes. It urges the reforestation of tracts which have already been stripped of timber, not only when located at the headwaters of navigable streams, but wherever this would be the most valuable use of the land.

Of at least equal importance with forest preservation are the prevention of forest fires, the regulation of hill-side farming, and prohibition of stripping the forest cover on mountain sides where the soil cover is thin. The Commission concludes that the chief responsibility for forest preservation and protection of lands from erosion rests with the separate States rather than with the Federal Government.

CITIZENS INTERESTED

Secretary A. C. Carton, of the Michigan public domain commission, says that correspondence he has had indicates that about four hundred citizens interested in various phases of conservation of public resources will attend a conference called to meet at the State capitol on June 12.

INSPECTION OF PLANTATIONS AND NURSERIES

WHEN you show a lumberman that the scientific replanting of denuded forest lands can be done at the rate of one cent a tree, planted from four to five feet apart; that the cost of proper fire protection is very small; that the trees planted can be thinned in twenty years at a profit, and that in from forty to fifty years the replanted section will be a valuable forest, he is likely to be impressed. Lumbermen, figuratively, are from Missouri. They are also intensely practical. They must be shown actual conditions, see the actual results.

This is what they did see when a number of them, all representative men, accompanied the directors and members of the American Forestry Association on a tour of inspection of the New York State nurseries and plantations at Lake Clear, Paul Smiths, and Saranac Lake on May 3. There, under the direction of Clifford R. Pettis, superintendent of state forests, they travelled over miles of replanted forest lands, and traversed acres of thriving nurseries, and what they saw and what they heard of the progress the State has made in the last ten years astonished them.

The first plantation made by the State in the Adirondacks was in the vicinity of Lake Clear Junction in the spring of 1902. About 600,000 trees were planted at that time, covering, approximately, 500 acres. No plantation was made in the spring of 1903, but the Ray Brook plantation was commenced that fall. The plantations are located at Lake Clear, near Saranac Lake, at Ray Brook, at Chubb Hill, near Lake Placid, and at Paul Smiths. Plantations are being made this year at Bensons Mines in St. Lawrence County; the Paul Smiths and Ray Brook plantations are being increased, another plantation is being made between Ray Brook and Saranac Lake, and one at Schroom Lake in Essex County. About 6,000 acres of State land have already been reforested.

Now as to what has been accomplished toward helping private owners of forest lands. During the past four years the state has made over 1,500 shipments of trees to private land owners who have purchased the stock to reforest their own lands. This spring the sales approximated four million trees. The state is also giving trees to the various state institutions for reforesting their lands.

As to the nurseries and their developments, the first Adirondack nursery was established at Saranac Lake in 1903. That nursery has been greatly increased in size, and in 1906 a forest experiment station was established in co-operation with the Forest Service, and various experiments were conducted and nursery practice studied. Since that time two nurseries have been established near Lake Clear Junction, one at Salamanca, one at Saratoga, and one is now being built at Comstock, at which place convict labor is being used.

The American Forestry Association party gathered at Paul Smiths on the morning of May 3, and after a delightful breakfast, for which the keen mountain air gave a decided appetite, the party drove to a series of extensive plantations. These plantations were of particular interest because they represent a complete series of experimental plantings by seed spot methods, direct seeding, and the use of nursery transplants, and also include a large variety of species. The broadcast sowing of white pine, for example, seems to promise ultimate success, although at present the stand is not as uniform as from planted trees. The seed spot method showed a great variation in results, due partly to damage by mice and squirrels. Even where good germination had been secured in the seed spots, one drawback appeared in that a little group of seedlings had to be thinned out and the extras used for filling in blank spaces, which adds materially to the expense.

Of the various species tried, Scotch

pine, Norway spruce, and strangely enough, western yellow pine showed the best results, Douglas fir and Colorado blue spruce being almost a total failure. Near the seed spot planting an extensive flat, which, according to local history, had been open land for probably over fifty years, although still showing evidences of an original stand of white pine, offered an interesting lesson as to the influence of soil on the growth of seedlings. This particular flat is of a sandy nature, probably underlaid with clay or hardpan, producing conditions so unfavorable to tree growth that, although the plantation had been once replanted, the trees were not in a vigorous condition and were making very slow growth. The ultimate success in the planting of heath lands in Europe leads to the conclusion that the trees will eventually become established in this poor Adirondack land. On the slopes in the same region the growth of planted trees is very vigorous, and many of them show a height growth of one to two or more feet annually.

In the afternoon the party visited the plantations near Lake Clear Junction, which were established ten years ago, and found a solid forest of fast-growing Scotch and white pine from ten to fifteen feet high, covering land which for years before had been a barren, burned-over waste. The Adirondack nurseries of the State were visited during the same afternoon, and the various operations from seed planting to transplanting were seen.

The action of the American Forestry Association in inaugurating educational trips of this kind is a distinct feature, and the fact that within a night's ride of New York City can be seen as extensive nursery and planting operations as can be found anywhere in Europe is an indication that some of our waste lands at least will be reforested. The most striking lesson, however, and one particularly apparent to those who have followed the developments in New York State for ten years, is that in this comparatively short period the at-

titude of the lumbermen, State officials, and of the public generally is absolutely changed. Ten years ago, when the first planting was done by the State and the nursery work was started, the whole scheme was subject to more or less ridicule. Ten years later we find some of the largest lumbermen in the East accompanying an educational party of this kind and studying with the greatest interest the methods of nursery practice and planting in vogue. Not only this, but several companies have in the meantime inaugurated work upon their own lands, specific cases being the International Paper Company, which is planting at the rate of 500,000 trees a year; the Union Bag Company, which has also been setting out young forest trees extensively; and the Brooklyn Cooperage Company, which is planting about 100,000 trees per year. There is no prophet who can foretell what the next ten years will bring forth; but if our legislatures will give us equitable forest tax laws and the fire problem comes under a fair measure of control, it is not a vain hope that the lumbermen, in addition to replanting, will be managing some of their properties on a long-time basis and cutting under methods which will insure natural regeneration instead of denudation, which has to be followed by artificial reproduction.

In the party were: Chester W. Lyman, International Paper Company, N. Y.; C. F. Quincy, President Q. & C. Co., N. Y.; E. A. Sterling, Forest and Timber Engineer, Philadelphia; C. H. Griffing, International Paper Company, N. Y.; J. W. Toumey, Director Yale Forest School, New Haven, Conn.; J. Randall Williams, wholesale lumberman, Phila.; W. D. Clark, Penn State College, State College, Pa.; Warren H. Miller, Camp Fire Club, Editor Field and Stream, N. Y.; R. M. Parker, Pres. Brooklyn Cooperage Co., N. Y.; P. S. Ridsdale, Executive Secretary, American Forestry Association, Washington, D. C.; C. F. Moore, Editor "Paper," N. Y.; John M. French, Editor Paper Trade Journal, N. Y.; F. W. Kelsey, Nurseryman, N. Y.;

Otto Luebker, Vice President American Audit Company, Washington, D. C.; C. R. Pettis, Supt. State Forests, Albany, N. Y.; M. H. Hoover, Chief Publicity Bureau, N. Y. Conservation Commission, Albany, N. Y.; Hugh P. Baker, Director N. Y. State College of Forestry at Syracuse University; F. F. Moon, Professor of Forestry, Massachusetts Agricultural College,

Amherst, Mass.; Walter Mulford, Director Department of Forestry, Cornell University; A. E. Edgcomb, Lumberman, Knoxville, Pa.; W. L. Sykes, Pres. Emporium Lumber Co., Buffalo, N. Y.; C. H. Sisson, A. H. Sherman Lumber Co., Potsdam, N. Y.; James L. Jacobs, Supt. Santa Clara Lumber Co.; and George A. McCoy, International Paper Company.

LUMBER MANUFACTURERS MEET

DELEGATES to the National Lumber Manufacturers' Association convention held a very enthusiastic and interesting meeting at Cincinnati on May 7 and 8, and among other things decided upon an aggressive policy for informing legislators and the public of the truth regarding the lumber industry, endorsed the work of the American Forestry Association and urged the members of its affiliated organizations to join the Association.

The resolutions asked for an amendment to the Sherman Anti-trust Law by which it will be possible for associations and combinations of lumber dealers of this country to compete on a fair basis with lumber corporations of other countries. They also asked Congress to permit the free passage of the Panama Canal to American vessels engaged in coastwise trade, for the purpose of encouraging American shipping and trade. Legislation providing for prompt measures of relief and protection from the Mississippi floods was urged, as also was legislation preventing the importation of nursery stock except under direct and full control of the Agricultural Department. Placing the diplomatic and consular service under civil service regulations was advocated and it was decided to oppose the Interstate Commerce Commission in its effort to surround milling-in-transit and concentration rates with so many restrictions as to make them of no practical use to lumber and box manufacturers. It was also decided to join the

Chamber of Commerce of the United States. The Association expressed its gratification at the exoneration of Edward Hines, James T. Barber and his associates, and Frank W. Gilchrist from the charges brought against them.

President E. A. Griggs presided and addresses were made by W. E. DeLaney, president of the Hardwood Mfgs. Asso.; F. E. Parker, president of the National Wholesale Lumber Dealers' Association; Manager Leonard Bronson; Hon. J. B. White, of Kansas City; R. A. Long, of Kansas City, Mo.; Paul E. Page, of Buckley, Wash.; R. M. Carrier, A. T. Gerrans; W. G. Collar, M. B. Nelson, all members of committees; Charles S. Keith, who spoke on the relation of the trust question to the lumber industry; R. S. Kellogg of the Northern Hemlock and Hardwood Mfgs. Asso.; Horton Corwin, of the North Carolina Pine Association; Bruce Odell, of the Michigan Hardwood Mfgs. Asso.; Samuel J. Carpenter, of the Yellow Pine Mfgs. Asso.; Robert H. Downman, of the Southern Cypress Mfgs. Asso.; W. A. Cooper, of the Western Pine Mfgs. Asso.; George X. Wendling, for the Pacific Coast Sugar and White Pine Mfgs. Asso.; George H. Holt, of Chicago; J. J. Donovan, of Bellingham, Wash.; H. S. Betts, of the Forest Products Laboratory, Madison, Wis.; P. S. Ridsdale, of the American Forestry Association, and E. A. Sterling, president of the National Wood Preservers Association.

ARE THERE TOO MANY FOREST SCHOOLS?

By FREDERICK A. GAYLORD

New York State Forester

SINCE the start of Forestry education in this country, there has been raised a cry of too many forest schools. Some of the leading foresters in the country have done all in their power to keep the number of forest schools down as low as possible. Is this the proper sentiment? In my opinion it is an extremely poor policy and it is the purpose of this article to try and show why it is a poor policy.

Although I consider it one of the least important arguments for increasing the number of forest schools, let us first review the field of the forester, both present and future. Until 1911 the United States Forest Service was the chief market for trained foresters. By far the greater per cent of the men turned out went into the national work, a few, a very few, went into State work, a few more went in with lumber companies. Aside from these positions there was little chance to obtain employment.

In the future the U. S. Forest Service will never again be able to take in all eligible applicants and there will constantly be more and more men thrown in to other channels. The government, however, will always be an important source of employment as, with the increasing intensiveness of management, we will have an increase in the number of foresters employed per unit area. The government also will be heavily drawn upon by outside operators requiring foresters.

At the present time, outside of Pennsylvania, there are less than fifty scientifically trained foresters in State employ. In the near future the State of New York alone will employ that many and at least two-thirds of the other States of the Union will employ them in like proportion. It is only a question of time before the timber resources of New York are unlocked, and when this occurs fifty foresters will be a small number to look after the details

of State work. This may seem like a large figure, but after a sane consideration, realizing that there are 12,000,000 acres of forest land in the State (of which one-sixth is now under State ownership), and a population admitting of very intensive management, the handling of these lands alone, to say nothing of the nursery work, the education of the public, surveying, etc., which will have to be done, makes this figure really seem very small. There is a tendency at the present time to regulate private cuttings. Ultimately this regulation will have to come about and thus bring at least 8,000,000 acres under State supervision. I take New York as an example of what will happen in practically every other State in the Union.

WITH LUMBER COMPANIES

Until the present-day lumber companies have employed extremely few foresters. In the future this will be the great field for trained men. The lumbermen of the United States are primarily business men and they only need to be shown how they can make a dollar more in order to take up the idea. In the past, because of the time element, danger from forest fire, market conditions, etc., the lumbermen have been very slow to take a serious interest in forestry. The next decade will see a tremendous change in this direction and already some of the largest companies operating in the east have employed foresters and other companies are rapidly showing signs of awakening interest.

When the lumber companies do come to a full realization of the benefits and profits derived from a scientifically managed forest I firmly believe that there will be a demand made on the forest schools of the country proportionately equal to that made by the government in the last few years. The conditions are vastly different with the

profession of forestry than with a profession such as mechanical engineering. In the latter the demand for men had to be made by the mechanical engineers themselves, in other words, they built the business as they went along. With forestry we have this business already in operation to its maximum extent and it is a business second only in importance to that of agriculture.

A fourth great source of employment for foresters is to be in connection with water companies and other companies or individuals holding timber land for other purposes aside from lumbering. Here will be one of the best chances to practice proper management and show that the net income depends directly on the amount of the investment, as the financial gain from the management of such forests will not be the all-important consideration.

Water companies, the entire country over, are making a serious effort to gain control of their watersheds merely for protective purposes and the growing of timber is the only use consistent with this object to which such holdings can be put and companies are usually satisfied if the revenue returned will pay taxes, etc., and at the same time show improvement of their land. It will be only a few years before the importance of wood production will not fall far below the main object of such companies.

The country over, there are millions of acres held by private individuals who have only an aesthetic interest in their holdings. If the aesthetic value of these forests will not be destroyed, when such forests furnish an appreciable revenue, so much the better and foresters surely will manage all such estates at a not very distant day.

CITIES EMPLOY FORESTERS

Many of the cities, particularly in eastern United States, employ foresters. In the true sense of the word these men cannot be called foresters and yet there is no training except that of forester which would fit them for their duties. Where these men are employed, the satisfaction obtained is very marked

and every town of over 40,000 to 50,000 inhabitants can well afford to employ a forester, and the larger cities more than one and ultimately they will be brought to this. In this connection would come also the handling of large public parks, of which there are a great many throughout the country. Here, of course, financial return would not be considered and yet to properly administer such lands, a great deal of forestry knowledge would be needed.

The vocation of teaching will constantly make more and more of a drain on all branches of forestry practice. At the present time it is almost impossible to get efficient teachers to properly equip such schools as are in existence.

Another branch of forestry which has not been developed as yet is that of the management of communal forests. Just how much of a factor this will be is very uncertain, but that it will be a factor, to some extent, we are very sure. Legislation making it possible to establish such forests, has already been passed by one State and steps toward establishing a county and also a city forest, have been taken in another State. Such forests will be largely managed by scientific men.

A very important field of the forester is in consulting work. There are some very successful men making a business of this at the present time and this line of work must necessarily increase by leaps and bounds in the future. There are thousands of holders of forest land whose possessions are not extensive enough to permit a forester spending his whole time thereon and yet the owner is ready to pay for the proper management. Reforestation, surveying, estimation of fire damage and the making of working plans, are all broad subjects and fall easily to the consulting foresters.

But let us get down to the real influence of the increasing number of forest schools. From the very beginning of the forestry movement, the advocates of this phase of conservation have spent their greatest amount of

energy in bringing the public to realize what forestry was and how it could be applied to advantage. This has been the fundamental principle underlying the whole movement. The American people as a whole stand high in the scale of civilization and they also are intensely practical. As with the lumbermen, they, as a whole, only have to be educated to the fact that the end of our timber supply is in sight and that by the proper management we can hold off that evil day, as well as make a good profit, and they will manage the forest lands of the United States, both public and private, accordingly.

VALUE OF TRAINING

I can conceive of no way of reaching the people more quickly and more thoroughly than by mixing in with them a large body of trained foresters. The point will probably be made that there will be many of these men turned out who will do much to give forestry a black eye, because of impractical recommendations. That there will be these men there is no doubt, but do people throw over the engineering sciences because some engineers are impractical? Would we close our churches because there are a few hypocritical ministers? I believe that forestry, as a profession, is at the present day able to stand alone and that the time has already passed when it is necessary for the forest schools to weed out their men for the sake of forestry. It may be policy to weed out men for the sake of the schools, but not for the sake of forestry. If we are considering the advancement of forestry, let us turn out all the men we can and through competition, let the best man win.

How many lawyers are there in the country that know anything at all about forestry? Probably not more than a score. Have you ever stopped to think what the future of forest law is to be, the number of questions which will arise from the destruction of timber or forest soil, the effects of forest cover on the country, trespass suits, etc., which the high price of timber is going to cause exactness in and only those lawyers who have had a forestry training

will be properly able to handle these cases.

Forest entomology and pathology are two sciences which are only in their infancy in the United States and for the bringing out of the proper relations of insects and disease to our forests, the investigators along these lines must have a broad forestry education.

A training in forestry, no matter how small, will be a decided advantage to any man who intends to handle timber land, even though he never intends to practice forestry himself and more and more business men will acquire a forestry education that they may be better enabled to carry on their business, where such a business is allied to timber or lumbering in any way.

Many men will take the forestry courses merely because of their broadness. Is there any other profession of the present day that requires as general and broad a training as that of the forester? I for one look forward to the day when such men, men who do not intend to follow forestry, will be turned out by the thousand, these men later to bob up in our courts, our city governments and our State or National Government, or even as the every-day sort of citizen, who will be able to take themselves, as well as to be able to instruct others to take an enlightened view of forest conservation, as its principles come before the people in the form of legislation or practice.

In short, I think forestry in the United States will advance in direct proportion to the number of men who are annually turned out from the forest schools of the country.

There is to be a place for all schools, the post-graduate schools, the undergraduate schools and the ranger schools, all combined to turn out men better equipped to advance the cause of forestry and only when every university and most engineering schools and colleges give forestry courses, then and only then will the profession of forestry be on an equal footing with other professions and then and only then will the progress of forestry obtain its maximum momentum.

SPORTSMEN AND FOREST FIRES

By HON. JEFFERSON BUTLER

President Michigan Audubon Society

MR. HENRY FORD, the automobile inventor of Detroit, has a farm ten miles out at Dearborn, containing 2,100 acres. I have supervision over the work being done for the protection of birds. Before Mr. Ford came into possession, this land was farmed by many small owners. They pastured the land, including the woods, with the result that we will spend five or six years in trying to get this land into proper condition for bird life. If pasturing causes so much trouble, what would a fire mean?

We have about 60 bob-whites that do nicely, they having quadrupled their number during the past two years, but no part of the farm is in condition for grouse and prairie chickens. We did have Hungarian pheasants but they left the farm and were probably shot. I think the growth was not dense enough. If we have a light growth, we will not have our game birds and the same is true of many varieties of our song and insectivorous birds, also. Our forest fires are for the most part wanton destruction and bring irreparable injury, not only to the sportsmen, but to every member of the community, State and nation.

During the past three or four forest fires in Michigan, I received communications from naturalists concerning the destruction of bird life. One swampy place near Alpena, which was surrounded by woods, had ducks, quail, coots and some of the plovers that had nested and reared their young. A witness wrote that he saw the old birds come out in large numbers toward the lake, circle around and go back, probably for their young, and he was certain that they had all perished, as he afterwards found remains that showed that at least large numbers had been destroyed.

Professor Hill, of the Forestry Department of the University of Michigan, informs me that we are using two-

thirds more of our forests than we plant, which of course means famine in the future. He also informs me that as much timber has been destroyed by forest fires as has been used for building and every other purpose in this country. If we had the forests that have been destroyed by forest fires, we would not be in the midst of a struggle to save our land game birds from destruction.

Our water birds prefer to follow the water along the woods because they find a greater variety of food and of course in greater abundance. The sportsmen should not only take active measures to prevent forest fires, but should use their whole influence in setting adequate measures to institute the work of reforestation. Much of our land, especially in the Upper Peninsula and the northern portion of the Lower Peninsula, is better suited for that purpose than for agriculture, although I know that some products grow in abundance. The States of Ohio, Indiana, Illinois, are populous and cannot now give the land for great forests. The more northerly States should reap a harvest from their forest preserves.

Most sportsmen I have met are fond of their wild songsters and they are generally acquainted with the chickadees, woodpeckers, blue jays, the owls, hawks and other varieties of useful birds. Many of them tell me they go not so much for the outing as for the shooting. I have kept closer records in regard to the song and insectivorous birds and know that many thousands have perished in forest fires. Sportsmen go out to commune with nature, to get acquainted with wild life. Man unacquainted with wild nature soon becomes superficial and artificial. What does a devastated forest present? I know of no sadder sight in nature.

In my judgment, Michigan should follow the United States Forestry Service in providing for a patrol. The

loss through fire in their work is but a fraction of one per cent of the timber. Michigan lost about \$3,500,000 in forest fires last year. Such a defenseless condition as now obtains should not be tolerated in a civilized community, especially since it has been demonstrated that adequate means can be employed.

Every sportsman and naturalist knows that forests not only provide the necessary food for many wild birds and animals, but afford protection also for the winter. To permit the destruction of the forest means the loss of their food supply and homes. Those that are left will not have adequate protection for their nests and young, and of course, being in a defenseless

condition, their extermination will be all the more rapid.

The Michigan Audubon Society, of which I am president, was organized for the protection of all forms of wild bird and wild animal life. We offer our co-operation to those engaged in the upbuilding of our forests, knowing that if we have not forests, we will have but few varieties of the wild birds and animals. We must stand together and help each other in every way possible in order that we may not only preserve the beauty of the landscape, but the many delightful forms of wild creatures that make life better and because we owe it to posterity to pass down the splendid inheritance we have received.

ATTENTION, LUMBERMEN

THE following resolution was passed at the annual convention of the National Lumber Manufacturers Association at Cincinnati, Ohio, on May 8:

WHEREAS, THE AMERICAN FORESTRY ASSOCIATION is maintained as a voluntary public service organization to further the perpetuation and better use of our forest resources, and

WHEREAS, it is the only organization which reaches and appeals direct to the public in a popular way regarding forestry and lumber matters, and maintains for this purpose a monthly magazine known as AMERICAN FORESTRY, and

WHEREAS, the lumber industry as a whole is keenly interested in forest conservation and in means of acquainting the public with the problems of fire protection, forest taxation, freight rates, legislation, and conservative management and reforestation,

BE IT RESOLVED, that the National Lumber Manufacturers' Association endorse the work of the American Forestry Association and pledges its support to the cause,

AND BE IT FURTHER RESOLVED, THAT EACH MEMBER OF THE NATIONAL LUMBER MANUFACTURERS' ASSOCIATION BE URGED TO AFFILIATE WITH THE AMERICAN FORESTRY ASSOCIATION BY BECOMING A MEMBER AND SUBSCRIBING TO THE MAGAZINE.

A PINCHOT PRIZE

Gifford Pinchot, of the class of 1884, Phillips Exeter Academy, and former national forester, has offered a small annual prize for proficiency in woodcraft and forestry which he hopes will incite the boys of the academy to use the woods and forests on Plimpton field more than they ordinarily would.

ENGLAND'S VANISHED FORESTS

The forests for which England was at one time famous have vanished, or only exist in the attenuated form of carefully preserved woods and parks, from which can be obtained only a fraction of the supplies needed.

SIXTY-FIVE PER CENT AGRICULTURAL SOIL —WHAT OF THE BALANCE?

By THOS. B. WYMAN
Secretary-Forester, Munising, Mich.

STATE GEOLOGIST R. C. ALLEN, after wide investigation, makes the statement that of the entire Upper Peninsula acreage the soil of sixty-five per cent is suitable for agriculture.

In round numbers there are ten millions of acres in this peninsula and Mr. Allen's figures, therefore, show six million five hundred thousand acres of land upon which agricultural crops can be successfully grown.

We are all interested in the development and settlement of this great area, which, each possessing a farm of a quarter section, would permit 40,625 farmers to permanently locate among us and create that unchanging populace that brings prosperity to every community possessing it. But, while we all possess the spirit to assist in this agricultural development work, there is a progressive association, the Upper Peninsula Development Bureau, which already has this matter well in hand, and to this association we offer our assistance in so far as it may be of service.

But that which concerns us more particularly at this time is the unmentioned balance—the worthless third—the thirty-five per cent or 3,500,000 acres not fit for the plow and harrow.

In the study of forestry, we learn that there are two general classifications of soil—agricultural and forest. The agricultural soil has already been mentioned and the second classification or forest soil covers that acreage with which we as timbermen have most to do.

We learn, further, that every acre should be devoted to that crop which will pay best and since we have been forced to eliminate agricultural crops, crop of timber alone can be considered.

The agricultural presents to the timberman the very poorest soil. He takes the best to himself; but after all, this is a fair proposition for the farmer growing his tender succulent crops, must produce them quickly, must harvest them before frost, must possess a soil rich in surface nourishment, while the hardy timber crops can grow slowly; is practically free from winter-kill and takes its nourishment from deeper soil strata. Again the most valuable timber species are often the least exacting in their soil requirements as is evidenced by the magnificent and highly valuable stands of white and Norway pines stocking our otherwise valueless sandy lands.

Further, extremely rough, hilly land of high fertility which, if cleared and cropped would suffer materially from hasty run-off, through gulleying and erosion can be cropped in timber to the advantage of all.

However, an unfortunate condition obtains; the great areas of level land formerly producing pine have been clear cut. No provisions were made for succeeding crops. No protection has been offered the regeneration which sprung up from the seed scattered between a few unsound and undersized trees which were not thought worthy of the ax. Fires have crept in through carelessness of fishermen and hunters and through the design of the berry picker. Natural regeneration has been swept away, the seed trees successively damaged until their crops of seed have become too small and too infrequent to restock the area. These pine lands are, therefore, largely pine plains unproductive, uninviting, and existing as a standing argument for a higher, more highly defined and perfected system of forest utilization and management.

Let the farmer produce single crop

and then abandon his farmstead and he becomes the subject of severe criticism; is given no sympathy; is accused of laziness, shiftlessness and a poor manager; of being unworthy of the title "Farmer." But can we not apply all of these criticisms to the timbermen who have reduced the forests with no attempt to reproduce it; who have removed valuable property from the tax rolls, leaving in its stead a fire trap and menace which must constantly threaten all neighboring investments. That such methods of harvest have characterized the utilization of our forests to date is indisputable. Let us admit that there is a vast area capable of producing the crop which is the basis of our activities now lying idle. Let us admit, further, that we are collectively responsible for a large percentage of this unproductive area. I say "we" advisedly, meaning those timbermen of our Peninsula both past and present who have taken wealth from the woods and have left poverty to posterity.

Admitting our share of responsibility for the conditions which exist upon three and one-half million acres of forest soil, or upon that portion which has not been cut over, have we not a duty to perform to those who will follow us as citizens of this great forest commonwealth.

Given a huge fortune and the means of creating a reasonable and permanent interest should we not perpetuate this asset and leave it as an inheritance to those who are entitled to share the pleasures which have been showered upon us.

Were proper rules adopted for those stands of timber which now stock our poorer soils, the conditions would not grow worse. Were reasonable precaution against fire, coupled with the encouragement of natural seeding distribution and occasional artificial planting of fail places, put into practice over

our barren and partially barren lands, we could look for and experience a constant improvement, and constant betterment of conditions, and we would experience further the feeling of a worthy accomplishment. If this area were placed under strict forest management, values would begin to accrue from the moment a proper stand of young timber was established and within very few years our unmarketable plains lands, now unsightly and undesirable, would have a sale value and be in commercial demand.

Since our forest soils are diversified in character, and timber seeks the soil in which it is best adapted, our forests would show diversified species, which again would best serve the needs of our peninsula. Pine would grow where they should and hardwoods on the soil of greater strength.

The Northern Forest Protective Association is endeavoring to protect the holdings of its members from fire and trespass. Could we not well undertake the discouragement of clear cutting on absolute forest soil and the rehabilitation of its already stripped areas, donating our services in this manner to the common good? Can we not adopt some forceful measure which will be the beginning of an attempt to procure and perpetually maintain for the Upper Peninsula of Michigan 3,500,000 acres of productive forests? We need the forest covering for climatic reasons; we need the covering to ally erosion and to increase soil fertility; we need the covering to protect the game and the game birds of our forests and we need the timber. But the greatest need is that spirit of fair play which demands that when a wrong has been done, a reparation be made. Let us lay the corner stone of the greatest public forest in the world by lending our aid in the upbuilding and maintenance of the "worthless third."

MRS. WILDER'S ARTICLE

The interesting article entitled "A Famous Old Tree" in the May number of AMERICAN FORESTRY was by Mrs. Anna A. Wilder of Washington, D. C., who is shortly to bring out a book entitled "Message of the Trees." Mrs. Wilder is the vice-president of the League of American Pen Women.

ERIC OUTLOOK SYSTEM

By F. B. KNAPP

JUST as scientific fire fighting is taking the place of the cruder methods of ten years ago, so outlook stations are being located in many States throughout the country to give quick and sure notice of fires in their incipient stages. An inquiry, however, brings out the fact that the methods of locating the fires when discovered are in general very rough.

The writer has been working on this problem for some years, and has found great difficulty till lately in interesting others in it. The answers, in response to letters and a circular recently sent out, indicate, however, that many of those in charge of the suppression of forest fires are now fully alive to the importance of more systematic methods.

All but five of the States with a forest service have been heard from. In many, the work is in its infancy or very much restricted by lack of funds.

Indiana represents four States where the wooded areas are so small and the houses so close together that no systematic means of discovering and locating fires is needed. Two replies came about the same time; one from the mountains, approving the plan for comparatively level country; and the other from the plains, considering it a fine thing for mountainous districts. In New Jersey the telephone is found sufficient; and in Washington patrols and telephone prove to be most effective, because the atmosphere is obscured in the dry season by smoke from land which is being cleared. Most of the other States, as well as some private organizations, either have outlook stations established, are now installing them, or are making plans and looking forward to such a system as soon as their legislatures give them the necessary laws and money.

The national forest service locates fires from two stations by compass and triangulation; and will soon issue a bulletin by Mr. D. W. Adams, on the

location and control of forest fires. New York has the most complete system now in operation of any State; using maps, which are, however, not oriented, and triangulation. New Hampshire has adopted the system described below, and will be ready for its use for the first time this spring; while other States are giving it a more tentative trial.

My attention was called to a German apparatus described in the *Forestry Quarterly*, volume 2, p. 253. It was designed and patented by Oberforster Seitz; and divides the district into 90 radial parts, with a color and form scheme for blocks which are hung out in varying combinations to designate the direction of the fire. Also fish horns are used which carry two or three miles. The area covered is within a circle of less than two miles radius.

The plan of the Eric Outlook System is to have main outlook stations manned as near as practicable and not more than twenty-five miles apart. These are provided with an outlook table, 26 inches or more in diameter, fixed in position, with an orienter map in the center, surrounded by a divided azimuth circle, and a panorama of the country giving names and distances. An alidade, pivoted at the center, is directed toward a fire, discovered by the marked eye or field glasses; and a thread is thereby stretched across the map, circle, and panorama to show the line of sight. If the fire is in plain view it is located by the panorama and map. When the smoke rises between two ridges it is determined within certain limits by the panorama and in direction by the circle. When seen vaguely, or over a ridge with a broad unseen expanse beyond, the direction is obtained by the circle, the exact location to be determined by tying in from another station or substation.

Secondary stations, manned at times of special danger, are located on intermediate elevations and are supplied

with either the outlook table or a subtable.

Substations, with no regular observer, have a subtable, eight inches in diameter, fixed in position, with divided circle, and a pin-and-thread alidade.

All stations are connected with each other, fire wardens, and officials.

The despatcher (who may be in the District Chief's office or an observer at a main outlook station) has the district map on a large table. He is the central officer to whom fires are reported; who gives orders; and in a big fire, till superseded by a superior officer, directs the general movements of firefighters, apparatus, and supplies.

All maps, including the pocket ones of the wardens, are supplied with a thread fastened at the location of each station within its bounds and a four-inch protractor surrounding such station. The fire is recorded on the map by description; by one hearing and the distance; or by two hearings indicated by the intersection of threads.

The adoption of such a comprehensive system for the quick and accurate location of forest fires will be one more step toward obtaining the control over them which all recognize as a necessary preliminary to the practice of scientific forestry in this country.

GROWING A WOODLOT FROM SEED

By J. A. FERGUSON

University of Missouri

EVERY farm should have a woodlot to furnish fuel, fence posts and other wood material needed. Especially is this true in the less wooded regions like the prairies, where wood products must often be transported long distances at considerable expense. Nearly every farm contains some land that is too poor for raising crops or that is not available for grazing or other purposes, which usually lies idle year after year. This land is a burden to the owner because it brings in no returns, yet must bear its share of the taxes. Such land ought to be devoted to the raising of forest trees. When we consider that an acre of land planted to fast growing trees will produce from one to three thousand fence posts in twenty years, and that with some species fence posts can be secured in less than ten years, a farmer, by allowing waste places to stand idle, is losing a return he could secure by a slight effort. It is not a difficult matter to start a woodlot, neither is it an expensive one. It can be done without any cost to the owner except the time and effort necessary to grow and plant the trees.

In starting a woodlot the selection of the kinds of trees to plant is an important consideration. They must be

trees that will give the product desired in the shortest possible time, and that will be suited to the particular conditions of soil and moisture of the tract to be planted. Because a tree grows well in deep, bottom land soil is no reason to believe that the same tree will grow well when planted on high dry uplands with thin soil. Trees vary greatly in their demands. Some are naturally hardy and will grow under many conditions of soil fertility and moisture. But most trees are fastidious in their demands and will not thrive unless they receive the amount of nourishment they need. So in selecting the trees, the site to be planted must be considered first and trees chosen that are suited to that site. The trees growing thriftily on situations similar to the one to be planted should be noted, and such trees selected for the planting. Often a tree not native to the region can be found that will produce better results than native trees. Nearly all trees grow well on deep, moist, fertile soil, so it is only when a planting is to be made on poor soil that the choice of species becomes important.

One reason why farmers do not start forest plantings is because they believe large trees are necessary which can be

purchased only at considerable cost. The best trees for starting a woodlot are one year old seedlings, which can easily be grown from seed by the farmer himself. Every farm should have a forest nursery for growing trees for starting forest plantings. Such a nursery can also be used to grow larger trees for planting about the house, along the roads and for making wind-

breaks. It should be located on well drained fertile soil such as might be selected for a garden. Where the space can be spared a portion of the vegetable garden makes an ideal nursery site. The soil should not be made excessively rich, as too fertile a soil will produce a rank growth in the seedlings, making them difficult to handle in transplanting.

AROUSING SCHOOL CHILDREN

ONE MILLION circulars on the prevention of forest fires are now being sent out from Philadelphia to the schools of Pennsylvania for distribution among pupils. It is planned to place at least one in the hands of each school boy and girl in the state; any other persons who wish one or more copies can easily obtain them.

The circulars, which teach the fire prevention in a practical way, are the result of co-operation among the Pennsylvania Forestry Association, the Pennsylvania Conservation Association, the Philadelphia Museum and Lehigh University.

On the first page are indorsements by the state superintendent of public instruction, Nathan C. Schaeffer; the commissioner of forestry, Robert S. Conklin, and Governor Tener.

To print the million copies of this circular, which is merely a four-page, 6 x 9 folder, required more than five tons of paper and 125 pounds of ink. It is printed in red and black.

Cuts in the leaflet show a raging forest fire, such as one cigarette or one match will start; while a cartoon is printed showing "the fool who rocks the boat," "the fool that didn't know it was loaded," and various other fools salaaming to "The Prize Fool—the Fool That Tosses Away a Lighted Match in the Woods."

Warnings against carelessness with fire in the woods and a list of practical things to do, and another list of what not to do, are printed, together with concise information as to the indirect and economic loss which results through forest fires as well as the direct loss.

Copies of this circular are distributed free of charge from the Pennsylvania Conservation Association, Harrisburg; the Pennsylvania Forestry Association, 1012 Walnut Street, Philadelphia; the Philadelphia Commercial Museum, Philadelphia, and Lehigh University, South Bethlehem.

FORESTRY CONFERENCE IN THE WHITE MOUNTAINS

UNDER the auspices of the Society for the Protection of New Hampshire forests, and the New Hampshire Forestry Commission, the Annual Forestry Conference in the White Mountains will occur this year at Bretton Woods, Thursday and Friday, July 18 and 19, 1912. There will be a preliminary day at North Wood-

stock, N. H., in order to visit the new purchase by the Society for the Protection of New Hampshire Forests at Lost River, and a meeting at the Deer Park Hotel in North Woodstock Village on the evening of that day. The North-Eastern Foresters, an organization that includes the State Foresters, the instructors in Forestry, and a few other

professional men, from Maine to Maryland, will meet at the same time and place. There will be meetings of the New Hampshire Timberland Owners' Association, and representatives present from Forestry Associations in the several New England States.

The Governors of Maine and New Hampshire have indicated that they will take part in this Conference. Representatives of the Forest Service, and other departments of the Government at Washington, connected with the administration of the Weeks Bill, will explain the progress of the National Forest in the White Mountains. Other topics for discussion will be, the acquisition of forests by towns and States in New England, protection of forests from fire, and regulation of the flow of water by forest cover.

Special consideration will be given to the subject of taxation of forests, and leading experts upon the subject will take part. This is an important subject in New England at this time, because efforts are being made both in Massachusetts and New Hampshire to change the Constitution and permit forests to be classified separately from other property. Reports will be made on recent purchases to save forest lands, both by public and private agencies, including the purchase of the Crawford Notch by the State of New Hampshire. The sessions of the Conference at Bretton Woods will be at the Mt. Pleasant House, that makes a special rate of \$3.00 per day to members of the Conference. The Mt. Washington Hotel and the Deer Park Hotel also make special rates. A cordial invitation is extended to all who are interested.

WOOD PRESERVING AND THE LUMBER INDUSTRY

AT THE annual meeting of National Lumber Manufacturers Association, E. A. Sterling, a forest engineer, of Philadelphia, and President of the American Wood Preservers Association, in a brief address, said:

"You all know that the wood preserving industry comes into contact with the lumber industry, and overlaps it at many points. The wood preserving industry is growing faster than many of us can keep up with. In 1900 there were 11 plants in the country. the last figures were 101 plants, with a growth of 120 per cent in the number last year. The value of the product represented at present is \$40,000,000, and the gross amount of wood treated in 1910 was 110,000,000 cubic feet.

"This is of interest to you, first of all because preservation takes certain woods and species which you have a difficulty in finding a market for. In the East it takes beech, birch, maple and red oak for cross ties and like purposes. In the South it takes sap pine, gum and so on down the line. It is of

great importance because in a way it means the opening of new markets.

"In this connection there is one thing on which we ought to cooperate, and that is inspection and grades. To my mind there is a distinct gap between the official grades of your various allied associations and the requirements of the consumer for treated material. This has come up in the case of every railroad which operates a treating plant. Say they have a use for long-leaf pine for various purposes. They want to get a pine which will treat better than the heart pine, but will have practically the same strength. In none of the existing specifications is anything which meets their need. The American Maintenance of Way Association has been working on this. I think it would be well to appoint a committee from the Wood Preservers' Association to cooperate with some of your committees on this question of specifications for creosoted material.

"There is one other thing, though it is still in the future. You are up against the fire question. Take

shingles for instance. I believe the time is coming when a preservative treatment, combined with a fireproofing treatment, is going to be developed for use by you as lumbermen. Although their shingles perhaps do not need a preservative treatment particularly, suppose the Pacific coast shingle manu-

facturers could advertise a preserved and fireproofed shingle, and push it as the cypress people are pushing their product in the magazines, wouldn't that counteract this movement against shingles? I believe it entirely possible to combine a preservative treatment of lumber with a fireproofing treatment for use under certain conditions."

STATE NEWS

Minnesota

Active opposition has developed to the bill recently introduced in Congress by Representative Lindbergh of Minnesota, which would allot 45,000 acres of land in the national reserve, near Cast Lake, to the White Oak Point band of Chippewa Indians. The State Forestry Service is up in arms over this attempt to cut down the area of the forest reserve, and will make every effort to have the bill defeated.

"I do not know whether this band of Indians is deserving of further allotments or not," said Forester W. T. Cox. "But I do know that they should not be given land in this reserve. The land is poor for agricultural purposes, but it has fine pine trees on it. The stand is good and the park is beautiful. There is land worth ten times as much as this north of Red Lake. If these Indians are to be given allotments it should be there, and not in the reserve.

"The timber has been cut according to scientific rules in there. There is a good second growth that is being protected, and the reserve is being given the best of forest fire protection. It is also valuable to regulate the flowage of the upper waters of the Mississippi. There is no occasion to give these Indians land in there, and it should not be done."

Washington

In the last seven years the State of Washington has appropriated \$153,950 for forest fire prevention and this year a fund of \$40,243.04 is available, says State Forester and Fire Warden J. R. Welty, who summarizes work done by the State in protecting the timber wealth and what is to be done this season.

Mr. Welty believes the State should make an annual appropriation of \$100,000 for forest fire prevention as good insurance on timber valued at \$400,000,000 in Washington. The work of the State Forestry Service for its seven years of existence, he says, has saved 6,000,000,000 feet of timber to the

State that otherwise would have been destroyed—timber valued at \$9,000,000.

New Hampshire

The Board of Forestry Commissioners has issued a circular in relation to reforesting waste and cutover land, which is being sent broadcast throughout the State.

The subjects covered in the circular are the increase of forest planting in New Hampshire, tax abatement on land planted to trees, State forest nurseries, kinds of trees to plant, how to secure trees for foresting lands, list of trees that can be obtained from the forestry commission, the preparation of land, the care of trees and the care of plantations.

Wisconsin

Plans for protection against forest fires were discussed at the first quarterly meeting of the Northern Hemlock and Hardwood Manufacturers' Association recently.

Timber land owners will meet in Wausau, Wis., soon to discuss plans for protection and adopt a system similar to the one used by the Forest Protective Association of Timber Owners of Northern Michigan.

A suggestion for a national forest products exposition was approved. In all probability it will be held in Chicago or some other large city of the Middle West.

The July meeting will be held in Holton, Mich., the date of which has not been definitely fixed.

Utah

O. W. Butler, of the district forestry service, having in charge the silvi-culture department, has gone to Boise, Idaho, where he will join District Forester E. A. Sherman and Assistant District Forester Timothy Hoyt.

From Boise the three foresters will proceed to Starkey, Idaho, where they will meet with the supervisors and rangers of that district.

The foresters are happy over the heavy fall of rain and snow of the past two months, as they say it means the saving of a great deal of money to the forest service department in the matter of preparations for, and the actual fighting of, forest fires. It cost much money to fight fires last year many of which were caused by the dry season of the early part of the year.

Kentucky

J. W. Newman, Commissioner of Agriculture of Kentucky, says of the tract of land purchased by the State near Louisville: "I am going to make of it a forest with a game preserve inside. This fall I shall plant twenty-five acres of the ground in commercial timber, used for manufacturing purposes, and each year, during State Fair week, visitors to the fair will be taken through the forestry and told the value of the different trees, just when they were planted, how long it took them to grow, and what they are used for principally from a commercial standpoint. I mean to stock the forestry with game of every kind, native to Kentucky. It will be used as a breeding place for game which will be distributed throughout the State."

Vermont

State Forester A. F. Hawes, of Vermont, in discussing forest fire protection with the fire wardens recently advised every town to keep a supply of long handled shovels, pails and sacks in several places where the wardens know where they are since oftentimes a man comes to fight a fire with no equipment with which to work. Handpumps attached to pails where water is convenient and can be brought by men are the most efficient fire fighter and it would pay every town according to Mr. Hawes to lay in a supply of two or three such pumps.

A good deal of waste expense is caused because the wardens delegate the fire fighting to others and do not keep account of the men's time. The State Forester urged prompt reports in cases of fires and more accurate statements as to cause. The most difficult report to get in is that of the cause of fires. The State department also urged that when wardens did not like to prosecute a man who might well be prosecuted under the statute the matter be referred to the department as a few prosecutions of the sort would do more than anything else to prevent careless fires in future.

Colorado

In February of 1909, in response to a request of the President of the United States and the U. S. Forester in Chief, the Governor appointed a Conservation Commission of 36 members which was organized

the month following with the Hon. F. C. Gowdy of Denver as chairman and Mr. W. G. M. Stone as secretary. Work began at once. Several meetings were held in connection with interesting programs during its life.

At the annual meeting, in 1910, the same officers were re-elected, and two or three meetings held during the year. At the second annual session, Col. Kenneth L. Fahnestock was elected president instead of Mr. Gowdy, who declined to take the presidency the third term. Before the newly-elected president got around to appoint his committees and organize his forces, he was taken sick and after an extended illness passed away, and for fourteen months the commission has lain absolutely dormant.

Whether it will rise from its sleep to new life and energy will not appear till after the State election in November, when the first vice-president, ex-Governor Adams, will order a call for a meeting. Till then it will sleep on disturbed by no sound political or economic that may threaten the natural resources of the State.

Some of the members desire its awakening; others care not a "sou" if it never wakens, and there are those who think it would be better if it were to shed its commission chrysalis and rise on the wings of a free and independent "organization." Six months must elapse before any one can know.

From appearances, conservation in Colorado, among the politicians and individuals desiring to get hold of the forest reserves and other resources of the State, is not at a premium. The people themselves, if at the helm, would doubtless have it otherwise.

Indiana

Tree experts in the employ of the Board of Park Commissioners of Indianapolis assert that widespread interest has been aroused in Indianapolis this spring over the care, protection and preservation of shade trees and shrubbery. Through the efforts of the forestry department of the Park Board in sounding an alarm, and statistics gathered from all parts of the city showing that thousands of valuable shade trees are dying annually from the blight and ravages of the San Jose scale and other plant-destroying insects, property owners have united in a concerted movement to save the trees by the methods adopted and recommended by the Park Board.

Pennsylvania

Important reforestation work is being done by the State Forestry Commission's nurseries this spring, and it is expected that when the shipment of seedlings is completed, that over 2,000,000 young trees will have been sent out. The majority of the

trees being shipped are white pine, and the fact that the State has been able to furnish so many for its own reserves and to private parties who agree to take care of them, illustrates the wisdom of the establishment of the nurseries several years ago.

The State has three nurseries, one in Bedford, one in Huntingdon and one in Tioga, with Mont Alto helping along. They are all on State reserves and have proved of great importance in the State's work in districts where replanting was necessary to conserve the water supply. Last year close to 2,000,000 seedlings were shipped.

Michigan

The State Game, Fish and Forestry Department has demonstrated that between 75 and 80 per cent. of the disastrous forest fires in Michigan in recent years are traceable to the carelessness of homesteaders and campers, according to John A. Higgins, the department's inspector of railroad locomotives and rights-of-way. A small percentage of the fires have been caused by sparks from locomotives and it is the duty of Mr. Higgins to see that railroads equip their engines with devices to prevent these fires.

Mr. Higgins is on a tour of inspection of the railroads of Michigan. He examines the equipment, the conditions along the rights-of-way that might be changed as a measure of fire prevention and advises railroads how to prevent fires.

Massachusetts

Campaigns for the prevention of waste are young as yet in this country, and yet they occasionally make their presence known. Almost every year Massachusetts has been the scene of destructive forest fires. One of the commonest reasons of the great waste through this cause has been that the fires gained great headway before they were discovered. To guard against this there has been established a chain of signal towers, reaching all the way from the coast to the New York State line. In these men will be stationed at all hours of the day and night, and it is felt that no fire can gain much of a start before it will be discovered.

New Hampshire

The danger from forest fires is called to

the attention of the people of the State in a circular issued from the office of State Forester E. C. Hirst, which follows:

It is extremely dangerous to leave slash and cut bushes along the railroad lines. Every year the railroads clear their right of way of inflammable material, but to insure safety a wider strip should be cleaned. If at this time land owners would co-operate with the railroad companies in clearing brush where cuttings have been made along the tracks, a great many fires would be prevented.

In nearly every town there are some heavy slashings along the most frequented roads awaiting the lighted match or cigar from a passing vehicle. Town selectmen and timberland owners would do well to clear the brush for a few feet along the roads where timber cutting has left an inflammable slash.

A little forethought and attention to such matters would lessen the fire danger materially and reduce the expense which the towns and the State bear in fighting forest fires.

Oregon

Giving a warning to all timber owners as to the burning of slashings, State Forester Elliott has issued the first circular of the season as to fire protective work by the State Board of Forestry. In the circular he calls attention to the necessity of burning slashings at favorable times as being a question of the greatest importance.

California

The forest rangers under R. H. Charlton, supervisor of the Angeles forest reserve, in conjunction with help to be furnished by J. M. Beard, who will this year have charge of the Sturtevant Camp in the Big Santa Anita canyon, will shortly begin construction of what forest rangers say will be the most picturesque trail for travelers in the Sierra Madres.

The trail will branch off the old Sturtevant trail at the Hermit's and will then follow the bottom of the canyon alongside Big Santa Anita Creek up to Sturtevant's. It will lessen the distance between Sierra Madre and Sturtevant's camp by three miles and will be a much easier grade the whole way, cutting out entirely the rattlesnake trail beyond Hoegge's camp.

NEWS AND NOTES

Forest Patrol Men

State Forester E. M. Griffith has appointed the following federal patrolmen for the forest reserves in Northern Wisconsin: T. B. McNutt, Minocqua; Guy Morrill, Gagen; M. H. Thompson, Rhinelander; H. M. Dunham, Woodruff; Fred Melby, Sayner, and T. D. Arnold, Rhinelander. The appointments are made in co-operation with the United States forest service. The patrol will work with the State forest rangers in protecting the timber at the headwaters of the Wisconsin and Chippewa rivers from forest fires. The government allows the State forestry board \$5,000 for the employment of these men.

The patrol will cover not only the State's reserves, but private lands in the midst of and adjacent to them. When not needed in protective work of that kind, they will be engaged in building roads, trails and fire lines. Most of the patrolmen will be mounted on horses. Those on railroad lines will be provided with hand-propelled velocipedes.

Fire Protection

Supervisor Nelson Macduff of the Santiam forest reserve in Oregon states that during the last year many important pieces of trail work have been finished to protect against forest fires. Mr. Macduff states that the government has purchased material for a telephone line 60 miles in length. This line will help protect the government timber on the Santiam reserve in Linn and Marion counties, and besides be of benefit to the private timber on the reserve.

Protective Association Active

The Northern Forest Protective Association of Michigan which was formed at a meeting of the timber owners of the upper peninsula held in Marquette a year ago this spring, will commence its season's work in the course of the next ten days. The object of the association is to protect the standing timber of the upper peninsula from being devastated by fire and to this end twenty rangers are kept patrolling the wooded sections north of the straits from early spring until after the beginning of winter. The work of the association last year proved a decided success and resulted in the saving of timber whose value mounted well up into the thousands.

Branch Organizations

The Massachusetts Forestry Association, which for the past 14 years has been actively engaged in agitating better forestry laws, has started to organize branch organizations in nearly all the large cities of the State. Organizations have already been formed in Worcester and Fitchburg, and the work of organizing a branch in this city is now under way. The purpose of these branch organizations is to bring members of the State organization together for local work.

Encouraging Tree Growth

The growing of trees in New York State has been penalized by taxing the crop as though it were a yearly crop; like wheat or oats, explains The New York Times. In order to pay the tax and escape its future burden, the farmers have been compelled to cut down their trees and market them. Now the Legislature has remedied this. The newly enacted Jones law exempts from assessment and taxation for thirty-five years parcels of one to 100 acres, which shall be planted for forestry purposes, with not less than 800 trees to the acre, while lands underplanted, with less than 300 trees to the acre, shall be assessed for thirty-five years at "50 per cent of the assessable valuation," exclusive of the forest growth. That puts a premium upon the planting of trees.

Aiding Floods

People who do not believe that cutting of forests about the head waters of streams will increase floods should read a recent bulletin of the government forest service, dealing with floods in the Castle Valley of Utah.

Previous to the settlement of this valley in 1878, there were no floods. Later, when cattle and sheep were pastured on its hillsides, destructive floods became very common, and would even follow a sharp summer rain. A committee of stock growers and farmers investigated the subject, and decided that the close cropping of the forage by cattle and sheep had let the water run off quickly into the valleys. Since grazing was restricted, the floods have largely ceased.

If such a slight obstruction as the light grass of the hillsides operates to hold water back and equalize its flow, how much more must the rich vegetable mould that gathers on and in the soil under the leafy protection of a thick forest?

Purchase of Lands

At a meeting recently at the office of the Secretary of War, the National Forest Reservation Commission had under consideration the advisability of purchasing lands in Virginia and West Virginia on the headwaters of the Potomac River, in North Carolina on the headwaters of the Nanthala River, and in the White Mountains in New Hampshire. These are areas in which a large number of tracts have been examined and appreciated by the Forest Service.

Specific recommendations were made by the service for the purchase of the tracts in Virginia, West Virginia and North Carolina, but no final action was taken.

With reference to the White Mountains final action by the commission cannot be taken until a report is received from the Geological Survey. The director of the survey reported that the field studies are progressing rapidly, and that he hopes to make a report within the next couple of weeks.

Sequoias for Florida

Four young scions of the Sequoia Gigantea family, which for 5,000 years has made its home exclusively in California, are to be transplanted from the big tree grove in California Redwood Park, Santa Cruz County, to Tallahassee, Florida.

The request for the trees, four feet high, was made by Governor Gilchrist of Florida, and was granted by Governor Johnson, who authorized State Forester G. M. Homans to superintend their removal from the forest.

Two of the trees are to be planted in the park surrounding the capitol at Tallahassee, while the other two will be placed in the grounds surrounding the executive mansion.

Forester Opposes Engineer

Questioning the authority of State Engineer Lewis of Oregon to issue a permit to F. W. Ross for the appropriation of the waters of the Breitenbush Springs, because they are not ordinary waters, but contain medicinal properties, George H. Cecil, forester for the district embracing the National Forest Reserve of Oregon, has written him on the subject.

He declares that Ross has applied to the Federal Government for the use of the lands where the springs are located as he contemplates laying some pipelines and building some bath houses. Under the statutes of the

United States, he says, it is his opinion that the only waters over which the State exercises jurisdiction are those used for power, domestic and irrigation purposes.

Arousing Forest Interest

With 800,000 acres of unimproved farm land in New York State, which is the best adapted for the growing of forests, the State Conservation Commission is endeavoring to arouse interest throughout the State as to the importance of planting trees for reforestation purposes. The commission has arranged a table showing the amounts of land in which this work can be carried on, devoting these tracts to the purpose for which nature intended them.

Forest Reserve Receipts

The Senate Committee on Agriculture has adopted an amendment to the agriculture appropriation bill providing that 25 per cent of receipts from forest reserves shall be spent on reserves where moneys originate, for construction of roads. Also an amendment increasing direct appropriation for road construction in reserves to \$225,000. Another amendment adopted appropriates \$35,000 for fighting alfalfa weevil and \$15,000 for studying sugar beet insect pests.

Seedling Distribution

Prof. J. Fred Baker, head of the Michigan Agricultural College Forestry Department, says the distribution of seedling forest trees this season has exceeded the records of all former years. Up to date 100,230 seedlings have been sent out and the distribution will continue as long as there are any trees left. The orders are not as large as in former years, but there are more orders and they have been coming largely from the southern and eastern sections of the State for the development of farm wood lots. The college is issuing bulletins of instruction on the care of wood lots.

The junior students in the forestry department are being placed for their summer work. Four have been found places in California, four in Colorado, fourteen in Montana and two in Arkansas. The young men will receive \$50 a month. The sophomore class will spend the summer in camp on the David E. Ward estate from June 19 to August 10, and will study surveying and timber cruising.

THE PHILIPPINE FORESTS

The forests of the Philippines, according to official figures, contain 200,000,000 board feet of lumber, half as much is in the forest reserves of the United States, but on one-eighth the area.

BOSTON'S TREE PLANTING

The city of Boston has appropriated \$25,000 for expenditure in tree planting and maintenance. Half of the amount is to be expended on trees already planted and the other half is to be used for setting out additional trees.

EDUCATIONAL

Dean Miller Resigns

The announcement of the resignation of Professor Frank G. Miller, Dean of the College of Forestry at the University of Washington, comes to every forester with a sincere feeling of regret. Dean Miller will sever his connections with the University to become Secretary-Treasurer and Local Manager of the Columbia-Wenatchee Fruit Company, an organization that will engage in an international fruit commission business. The new departure in Professor Miller's career will be a distinct loss to the profession and especially so in the Pacific Northwest where the foresters and many of the lumbermen have learned to recognize in him a powerful force in the local development of forestry. As he will continue to make Seattle his home we may still hope that he will find time to keep up his interest and continue in a general way to be a force in the betterment of forestry conditions in the Northwest.

Mr. Miller was born at Lenark, Illinois, June 2, 1866. His early training was received at the Iowa State Normal School. From 1893-1899 he was Superintendent of Schools, first at Parkersburg and later at Dunlap, Iowa. During this period he spent some of his summers in study at the University of Chicago. In 1900 he received the degree of Ph.B. from the University of Iowa, in 1901 B.S.A. from the Iowa State College, and in 1903 M.F. from Yale University.

He immediately entered the United States Forest Service and was placed in charge of forest planting investigation in Nebraska. This work gave him a most excellent opportunity to become thoroughly familiar with the especial needs of forestry in that region and before the close of that year he was called to the University of Nebraska to organize a Department of Forestry. His broad educational foundation and his extensive experience in teaching especially fitted him to undertake this work. Under his direction the school advanced rapidly and when he left there in 1907 to organize the College of Forestry at the University of Washington the Nebraska School was recognized as one of the established forest schools of the country.

At the University of Washington, where the department was to be organized as a separate college and the local conditions for instruction in forestry are exceptionally good, Professor Miller soon controlled his opportunities, so that the growth and development of the College have been remarkable. During the five years since its organization the College of Forestry has grown under Dean

Miller's direction to an institution with three distinct groups of study and two short courses that at present meet all the requirements for instruction in forestry in the region. The School of Forestry at Nebraska, and the College of Forestry at the University of Washington, will always stand as a monument to Prof. Miller's active interest in forestry in this country.

Since he first took up the work of forestry, Prof. Miller has carried on extensive studies in forest extension and has published several pamphlets on this subject. During the past year he has made an extensive study of Forest Taxation in conjunction with Mr. Frank B. Kellogg of the Forest Service. This work will probably be published before the close of the year.

Professor Roth to Remain at Ann Arbor

It was announced earlier in the winter that Professor Filibert Roth, head of the Forest School at the University of Michigan, was to go to Cornell the coming summer, to take charge of the forestry work at that institution. Professor Roth has changed his plans and will remain in Michigan.

Cornell to Have \$100,000 Forestry Building

Governor Dix of New York has approved the bill passed by the State Legislature appropriating \$100,000 to Cornell University for a forestry building. Plans for the building are now being drawn, and it is expected that ground will be broken this fall, and that the building will be ready for occupancy at the opening of the University in September, 1913.

The trustees of Cornell University, at a meeting held on April 27th, adopted the degrees to be given to foresters graduating from Cornell. The course will cover five years, with the degree Bachelor of Science at the end of the fourth year and Master in Forestry at the end of the fifth year.

As Professor Roth is not to come to Cornell, Professor Walter Mulford is to have charge of the department, and will have three other professors with him.

The department now has about 300 acres of land available for forestry purposes within three miles of the University campus. Part of this is open ground to be used for experimental and demonstration plantations. Included in the area are also 9 woodlots, presenting a variety of silvicultural conditions and problems. White pine, hemlock and hardwoods are all well represented in these stands.

Colorado School Sells Land

On March 1, 1912, Colorado College sold 3,240 acres of its Manitou Park Forest Reserve of 9,560 acres. The land sold was valuable only for agricultural and grazing. There was on it also a summer hotel. The result of this sale is to give the School an excellent beginning for an endowment fund, and to relieve the faculty of much administrative work in connection with the ranch and hotel. The remaining portion of the reserve, 6,320 acres, is practically all timbered and Western Yellow Pine and Douglas Fir. The School retains the group of cottages which have been used as head-

quarters for field work. The reserve, with its present area, offers excellent opportunities for conducting an object lesson in forestry. The stand of timber is about 10,000 M. feet B. M., and the annual growth about 300 or 480 M. feet B. M.

This spring the senior class has been transferred to the lands of the Castilla Estates Development Company in Northern New Mexico for mapping, estimating and the preparation of a working plan. This arrangement not only gives the students opportunity to see timberlands different from those at and near Manitou Park, but also enables the School to carry out a project which the company has been anxious to have executed.

RECEIPT FOR A RANGER

By J. B. CAMMANN

First get a big kettle and a fire that's
hot,
And when everything's ready throw in-
to the pot,
A doctor, a miner, of lawyers a few,
At least one sheep herder and cow boy
or two.
Next add a surveyor, and right after
that
A man with some sense, and a good
diplomat.
At least one stone mason, then give it
a stir,
And add to the mess one good car-
penter.

A man that knows trees, and don't
leave from the list,
A telephone man, and a fair botanist.
The next one that's added must be
there, that's a cinch.
It's the man that will stay when it
comes to a pinch.
Add a man that will work, and not
stand round and roar
Who can do ten thousand things and
then just a few more.
Now boil it up well and skim off the
scum,
And a Ranger you'll find in the
residuum.

DO WE ENCOURAGE FOREST FIRES?

The destruction caused by forest fires in North Carolina during 1911 was very little less than that reported for 1910, according to a compilation being made by the North Carolina Geological and Economic Survey, and soon to be published. Only one-third of the townships of the State have sent in reports, but enough has been learned from them to show that no great reduction in the annual damage done by fires has taken place. This damage is estimated to approximate \$450,000, which includes estimated damage to young growth, which in many cases exceeds the damage done to the standing timber. The number of fires reported was 637, which is slightly less than those reported last year and slightly more than was reported for 1909.

PAMPHLET ON ARBOR DAY

The Public Library of Jersey City has just published a useful little pamphlet entitled "Arbor Day and some facts about Trees." This publication is not only a useful handbook for school teachers and the public generally, but is also a valuable contribution to the cause of conservation. The origin and history of Arbor Day and the benefits derived from its observance are briefly stated, and the value of forests and various interesting facts about trees are given in a short, concise form.

QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

Brunswick, Maine.

EDITOR.—Will you kindly send me any information possible upon possibilities and opportunities for college men in forestry? By college men is meant men with an A.B., or equivalent, degree who contemplate a graduate course.

EDWARD W. KENT.

There are abundant opportunities, and they are increasing, for the practice of forestry by competent, trained foresters. Salaries are not large, but they compare favorably with those in any other profession and they are tending toward a higher level. The opportunities are found in the National Forest Service, which employs a large number of men and furnishes valuable experience in various fields; in the forest services of the different States, many of which are going into this work and paying fair salaries to good men; and there is also an increasing call for foresters in practical lumbering, as the lumber companies and others that are working in forest products see the need of scientific handling of their properties. So much for the opportunities for work. The three leading schools that are open to college graduates are those at Yale, Harvard and Michigan. For the man who wishes to rise to the highest point in the profession, and who has the educational equipment to begin with, one of these schools will be best. You can, of course, secure detailed information in regard to their courses, terms, etc., by writing to the schools.—*Editor*.

Columbus, Ohio.

EDITOR AMERICAN FORESTRY.—A gentleman whom I know asserts that at one time the Sahara Desert and all other desert areas were covered with dense forests. Will you kindly tell me if this is true?

JOHN W. WINN.

So far as I am aware, there is no evidence whatever that the desert lands of the world have ever been covered with forests during historical times. It is, of course, possible that in some previous geological era with different climatic conditions, forests existed where deserts are now found. In most of the desert regions which are found today, the precipitation or the humidity of the air is too low to permit of tree growth. In most of these regions trees could be grown if water was supplied artificially by irrigation, but under natural conditions the extreme aridity of the country makes their establishment impossible.

It is possible that the gentleman who brought the matter to your attention referred to lands which are known to have been covered with forests within historical times, but which have since been denuded and may be completely barren. This has happened in a number of regions, especially in the mountains where the reckless destruction of the forest has been followed by torrents and erosion which have destroyed the soil cover and have prevented the reestablishment of tree growth.

S. T. DANA,

Editorial Advisory Board.

New York City.

EDITOR AMERICAN FORESTRY.—Will you kindly give me full information regarding the prices of lumber at various periods and whatever information you may have regarding timber conditions in the United States?

J. F. GRAY.

This information takes up too much space to print here; so, through the kindness of O. T. Swan, in charge of the Office of Products of the Department of Agriculture, the detailed information has been mailed.—*Editor*.

THE AMBITIOUS TREE.

An unusual publicity project is being conducted jointly by the school authorities of several of the Pacific Northwestern States and the Western Forestry & Conservation Association in distributing through the public schools several hundred thousand copies of a story called "The Ambitious Tree," written by E. T. Allen, to interest boys and girls in forest protection and especially in preventing forest fires. Over 165,000 are being placed in Washington and Idaho schools alone. The story tells of the life and struggles of a western forest tree and the part it plays in community development and prosperity.

CURRENT LITERATURE

MONTHLY LIST FOR MAY, 1912

(Books and periodicals indexed in the
Library of the United States
Forest Service)

Forestry as a Whole

- Hanson, C. O. Forestry for woodmen. 222 p. il., pl. Oxford. At the Clarendon press, 1911.
- Nisbet, John. The elements of British forestry; a hand-book for forest apprentices and students of forestry. 345 p. il. Edinburgh and London, W. Blackwood and Sons, 1911.
- Philipp, Karl. Forstliche tagesfragen mit besonderer berücksichtigung der badischen waldwirtschaft. 171 p. Freiberg im Breisgau, Herdersche verlagshandlung, 1912.

Proceedings and reports of associations, commissions, etc.

Great Britain—Departmental committee on forestry in Scotland. Report, with appendices and evidence. 95 p. map. London, 1912.

New South Wales—Dept. of agriculture—Forestry dept. Report for the year ended 30th June, 1911. 33 p. pl. Sydney, 1912.

Forest Botany

Trees, classification and description

- Bourdillon, T. F. The forest trees of Travancore. 456 p. pl. Trivandrum, Government press, 1908.
- Lamb, William H. The catalpa septum, a factor in distinguishing hardy catalpa. 2 p. il. Wash., D. C., Society of American foresters, 1912.

Silvics

Forest influences

Zon, Raphael. Forests and water in the light of scientific investigation. 100 p. Wash., D. C., Gov't. printing office, 1912.

Ecology

Cajander, A. K. Über waldtypen. 175 p. Helsingfors, 1909. (Fennia, 1909-1912, v. 28, No. 2.)

Studies of species

Schwappach, Adam. Die rotbuche; wirtschaftliche und statische untersuchungen der forstlichen abteilung der hauptstation des forstlichen versuchswesen in Eberswalde. 231 p. pl. Neudamm, J. Neumann, 1911.

Silviculture

Planting

Reitzenstein, Friedrich von. Die baumschulen von H. H. Pein in Halstenbek, Halstein. 12 p. il. Berlin, P. Parey, 1909.

Insects

Forest Protection

Pergande, Theo. The life history of the alder blight aphid. 23 p. il. Wash., D. C., 1912. (U. S. Dept. of agriculture—Bureau of entomology. Technical series No. 24.)

Fire

McGillivray, J. H. Michigan forest scouts, for the protection of frontier life and property and reforestation; auxiliary fire wardens exploited by the Game, fish and forestry department. 55 p. Lansing, Mich., 1912.

Forest Administration

United States—Department of agriculture—Forest service. April field program, 1912. 32 p. Wash., D. C., 1912.

Forest Engineering

Surveying and mapping

United States—Department of agriculture—Forest service. Instructions for making forest surveys and maps, revised Dec. 25, 1911. 84 p. il. Wash., D. C., 1912.

Forest Utilization

Noyes, William. Handwork in wood. 231 p. il. Peoria, Ill., The Manual arts press, 1910.

Schenck, C. A. Logging and lumbering, or forest utilization; a text book for forest schools. 189 p. il. Biltmore, N. C., Biltmore forest school, 1912.

Schneider, E. E., and Foxworthy, F. W. The uses of Philippine woods. 50 p. Manila, P. I., 1911. (Philippine Islands—Bureau of forestry. Bulletin 11.)

Lumber industry

Northern pine manufacturers' association. White pine and Norway pine. 25 p. il. Minneapolis, Minn.

Wood using industries

Harris, John T. The wood-using industries of Alabama. 12 p. New Orleans, La., Lumber trade journal, 1912.

Harris, J. F., and others. Wood-using industries and national forests of Arkansas. 40 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 106.)

Auxiliary Subjects

Conservation of natural resources

National conservation congress. Addresses and proceedings of the 3d National conservation congress at Kansas City, Mo., Sept. 25-27, 1911. 319 p. Wash., D. C., 1912.

Botany

Spalding, Volney M. Present problems in plant ecology; problems of local distribution in arid regions. 11 p. Wash., D. C., Gov't. printing office, 1910.

Political economy

Dartmouth college. Addresses and discussions at the conference on scientific management held Oct. 12-14, 1911. 388 p. pl. Hanover, N. H., 1912.

Periodical Articles*Miscellaneous periodicals*

Agricultural journal of the Union of South Africa, March, 1912.—How to raise trees from seed, by G. A. Wilmot, p. 386-7; Two fungous diseases of coniferous trees, by J. Fisher, p. 389-91.

Botanical gazette, April, 1912.—Relation of the daily march of transportation to variations in the water content of foliage leaves, by B. E. Livingston and W. H. Brown, p. 309-30; Ray tracheids in Abies, by W. P. Thompson, p. 331-8.

Country life in America, April 15, 1912.—American forestry; a new movement to meet a growing need, by H. S. Graves, p. 33-34.

Country life in America, May 1, 1912.—The charm of the dogwood tree, by N. Roosevelt, p. 19-20.

Craftsman, March, 1912.—Conservation; the great principle of national thrift, by O. W. Price, p. 585-94.

Gardeners' chronicle, April 6, 1912.—British elms, by C. E. Moss, p. 216-17.

Phytopathology, April, 1912.—Notes on some diseases of trees in our national forests, by George Grant Hedgcock, p. 73-80.

Revue horticole, April 16, 1912.—Albizzia nenu, by S. Mottet, p. 184-6.

Scientific American, April 27, 1912.—A substitute for pencil cedar, p. 386-7.

World's work, May, 1912.—The unknown wonders of our national parks, p. 68-77.

Trade journals and consular reports

American lumberman, April 13, 1912.—Beauty and utility; the American chestnut, p. 1; Composition flooring of sawdust and magnesium chloride, by R. P. Skinner, p. 36; Western forestry and conservation association; annual meeting, p. 50 B-C.

American lumberman, April 20, 1912.—Some construction, timbers of the Philippines; white lauan, by H. N. Whitford, p. 33; Patent silo business profitable to retailer, by C. E. Davidson, p. 40-1; Efficient methods of handling logs at mill, by G. F. Willis, p. 43; Steam traction engine for lumber service, p. 56.

American lumberman, April 27, 1912.—Turpentine methods, p. 28; Bagtican lauan, by H. N. Whitford, p. 31; Production and consumption of pulp and paper products in the west, by J. B. Knapp, p. 43-6.

American lumberman, May 4, 1912.—Almon lauan, by H. N. Whitford, p. 44.

American lumberman, May 11, 1912.—Forests in Europe, p. 29; Lumber prices, by R. S. Kellogg, p. 47; Development of cutover lands, by B. Odell, p. 50 A-B;

The lumbermen and wood-using industries, by M. Cline, p. 50 B; In behalf of the American forestry association, by P. S. Ridsdale, p. 50 B; Combination impossible in the lumber industry, by C. S. Keith, p. 50 D-H.

Barrel and box, April, 1912.—From the tree to the distillery, by W. L. Wellford, p. 42-3; Drying lumber in dry kilns, p. 53. Canada lumberman, April 15, 1912.—Various ways of utilizing sawdust, p. 39; Top logging as a protective measure, by W. W. Gleason, p. 42.

Canada lumberman, May 1, 1912.—The economical piling of lumber, by J. F. Hobart, p. 39, 42; Cutting and hauling hardwoods, p. 52; Difficulties met with in log scaling, by D. L. Wiggins, p. 54.

Engineering news, April 11, 1912.—Forests and floods on the North Pacific coast, by H. M. Chittenden.

Engineering record, Feb. 24, 1912.—The use of treated wood paving blocks, by F. M. Bond, p. 223-4.

Engineering record, March 30, 1912.—Continuous wood-stave pipe, p. 342; Reforestation from the point of view of the railroads, p. 357; Grouping timbers for antiseptic treatment, p. 360.

Hardwood record, April 25, 1912.—Osage orange, p. 28-9; Utilization of wood waste, p. 36.

Hardwood record, May 10, 1912.—Pecan, p. 25-6; Cedar and utility chests, p. 36 c-d; Use of steam in drying lumber, p. 36d-38.

Journal of electricity, power and gas, May 4, 1912.—Novel wooden tower line construction, by O. G. Steele, p. 393-6.

Lumber trade journal, May 1, 1912.—Wood-using industries of Alabama, by J. T. Harris and H. Maxwell, p. 19-30; Henry Hardtner tells of states conservation needs, by H. Hardtner, p. 34-5.

Lumber world review, April 25, 1912.—The problem of lumber seasoning, p. 25-6.

Municipal journal and engineer, April 25, 1912.—The greatest enemy of the shade tree; injury done by curb stone, by C. Bannwart, p. 619-21.

New York lumber trade journal, May 1, 1912.—Utilization of wood waste, by J. M. Gibbs, p. 24-6.

Paper mill and wood pulp news, April, 1912.—Canadian pulp woods, by J. A. De Cew, p. 19, 26.

Paper trade journal, May 2, 1912.—To utilize waste in paper making, by B. Loomis, p. 54.

Railway and engineering review, April 20, 1912.—Grouping of timbers for preservative treatment, p. 355-6.

St. Louis lumberman, April 15, 1912.—The standard cross tie machine; a line of portable mills that is making good in many ways and at many points, p. 66.

Southern industrial and lumber review, April, 1912.—Creosoted wood block pavements, by J. C. Dionne and others, p. 43-59.

- Southern lumber journal, April 15, 1912.—Wooden block pavement, p. 38.
- Timber trade journal, April 20, 1912.—A remarkable Honduras mahogany log, p. 797; Fields and forests in the Spree valley, p. 800.
- Timberman, April, 1912.—California conservation commission and timbermen discuss forestry, p. 22-7; Utilization of overhead system for lowering logs down steep grades, p. 49; Aerial transportation of lumber, p. 52-3; British Columbia includes fire prevention measure in new forestry act, p. 54-5.
- United States daily consular report, April 16, 1912.—Lack of forests in China, by S. S. Knabenshue, p. 214.
- United States daily consular report, April 17, 1912.—Composition floorings of magnesium chloride, by R. P. Skinner, p. 229-31.
- United States daily consular report, May 2, 1912.—Cork industry of Spain, by C. S. Winans, p. 433-6.
- Wood craft, May, 1912.—The making of office and library supplies, p. 35-9; The high piling of lumber from cars, by J. F. Hobart, p. 42-4; The interior finish woodwork of houses and flats, by J. Bovington, p. 48-51; Opportunities in the study of wood structure, p. 64-5.
- Wooden and willow-ware trade review, April 11, 1912.—Basket making in Jamaica, p. 17.
- Forest journals*
- Allegemeine forst-und jagd-zeitung, March, 1912.—Die natürliche verjüngung der nadeldölzer in Thüringen nebst einigen bemerkungen über diese form der bestandes-begründung, by A. Menzel, p. 73-90; Tiefpflanzen für trockeneren boden, by Tiemann, p. 90-4.
- Canadian forestry journal, March-April, 1912.—Constitution and by-laws of the Canadian forestry association, p. 29-30; Forests of the Oxford house district, N. W. T., p. 31-4; Investigations on forest insects, and forest protection, by C. G. Hewitt, p. 35-7, 47; Stumpage prices in British Columbia, by R. D. Craig, p. 39-41; Tree planting in southern Alberta, by A. Mitchell, p. 42-47; Canadian pulp woods; the species useful for paper manufacture and their qualities, by J. A. De Cew, p. 48-50; Value to a farm of a woodlot, by W. F. Payne, p. 51-53.
- Centralblatt für das gesamte forstwesen, March, 1912.—Ueber die dauer der eisenbahnschwellen, by K. Havelik, p. 105-15; Die längenmessung mit dem drahtseil, by H. Dock, p. 116-28.
- Forest leaves, April, 1912.—Protection of plantations, by J. W. Seltzer, p. 115; Proper method of transplanting trees, by G. H. Wirt, p. 118; A new sprouting axe and its advantages, by W. G. Conklin, p. 118-19; Forestry of a railroad, by J. Foley, p. 119-20; The Pennsylvania forestry reservation commission, p. 120; New York state forestry, p. 123-4; Fighting forest fires, by T. D. Collins, p. 124; Methods of reforestation, p. 125-6.
- Hawaiian forester and agriculturist, April, 1912.—Street tree planting, by R. S. Hosmer, p. 123-7.
- Indian forester, April, 1912.—Extraction of teak timber in the Pynmana forest division, upper Burma, p. 151-4; A short preliminary note on the suitability of the deadwood of *Acacia catechu* for katha making, by P. Singh, p. 154-6; *Podophyllum emodi*, by P. Singh, p. 156-61.
- Quarterly journal of forestry, April, 1912.—Experiments on trees at Colesborne, by H. J. Elwes, p. 83-111; The structure of the timbers of some common genera of coniferous trees, by W. S. Jones, p. 112-34; Growing larch for profit, by W. Schlich, p. 134-9.
- Revue des eaux et forêts, March 15, 1912.—Forêt domaniale de Hez-Froidmont, by L. Pardé, p. 160-75.
- Revue des eaux et forêts, April 1, 1912.—Plantations de pin Weymouth dans les terrains Marécageux, by C. Hatt, p. 193-5; Simples observations sur la rusticité de quelques résineux cultivés en dehors de leur station naturelle, by A. Jolyet, p. 196-211.
- Schweizerische zeitschrift für forstwesen, March, 1912.—Aphorismen zur biologie des waldes, by U. Meister, p. 77-87; Die vernichtung der engerlinge in den forstgärten, by Decoppet, p. 122-9.
- Zeitschrift für forst-und jagdwesen, March, 1912.—Die unabhängigkeit des bodenwerts von dem holzbestandswert, sowie des holzbestandswerts von dem bodenwert, by Frey, p. 129-36; Insekten-und pilzschäden an den eichenbeständen der Provinz Westfalen, by O. Baumbarten, p. 154-61.

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A DEFINITE STATE FOREST POLICY

NEW YORK STATE'S PROGRESS IN REFORESTING THE ADIRONDACKS

BY E. A. STERLING

INTENSIVE forestry is dependent, among other things, upon a ready and accessible market for both major and minor forest products, adequate transportation facilities, and the use of capital drawing a low rate of interest. Stated inversely, intensive forest work is not practical in remote regions, and crude, wasteful lumbering methods, through no fault of the lumbermen, must be followed where density of population and stability of conditions do not permit more conservative methods and provision for the future.

The State of New York, by virtue of age, population, wealth, and transportation facilities, would seem to have approximated European conditions sufficiently to justify intensive forest management, both on State and private lands. As bearing this out, we find that forestry principles are finding application on large forest areas under ownership by the State, this policy having developed for the first time in America in the State which is foremost in many lines of industry and perhaps best fitted to father such a policy. While the existence of a definite State forest policy is an actual fact, it happens that it cannot be primarily attributed to the theoretical factors mentioned, nor based on the same conditions which obtain in Europe. But the work is no less commendable on this account. The real cause for the extensive forestry policy on State timberlands in New York is founded primarily on the preservation of the Adirondacks watershed and on the desire of wealthy citizens, particularly in the larger cities, for the maintenance, at the State's expense, of the enormous

natural park and playground in the wild and yet easily accessible region comprising the Adirondack mountain uplift.

A brief historical review is necessary to a clear understanding of the conditions existing and the work going on today. As far back as 1872, Horatio Seymour, twice Governor of the State and once a candidate for President, perceived the need for State ownership of the Adirondack watershed. Through his initiative a State Park Commission was appointed, which, after investigation, found that the State then owned only 40,000 acres in that region. Eleven years later, in 1883, the recommendation of the first Park Commission forbidding further sales of State lands and their retention when forfeited for the non-payment of taxes received consideration. By acting upon these recommendations the State came into possession of 600,000 acres of delinquent tax lands. A Forest Commission was appointed under the Act of 1885 and was superceded ten years later by a Commission of Fisheries, Game and Forests; while in 1903 the Commission was changed to a single Commissioner, and in 1910 to a Conservative Commission.

In 1897 new legislation was passed and an arbitrary area was set aside as a State preserve, bounded by the so-called "blue line." A Forest Preserve Board was appointed to purchase additional forest lands within the proscribed limits, and some \$3,500,000 was spent up to 1907 for the purchase of forest lands. This policy of consolidating the holdings within the proscribed forest park limits has been fol-



Photo by R. E. Gooding.

SECOND YEAR SEED BEDS PATNODE NURSERY, LAKE CLEAR JUNCTION.

(There are in this nursery of approximately two acres over five million seedling trees.)

lowed with several intermissions up to the present time, and in 1911 the total State holdings comprised 1,643,000 acres, of which all except 112,000 acres in the Catskills, is located on the Adirondack plateau. The total area within the park limits comprises about 3,400,000 acres, so that the alienated lands still comprise about one-half of the total area.

The acquirement by a wealthy State of such an enormous area of forested and potential forest land is a mark of a distinct progress. The reverse side of the picture is that enthusiastic but ill-advised reformers, with all good intention, succeeded in 1893 in securing the passage of a constitutional clause preventing the cutting of trees, dead or alive, on State lands and declaring that they shall be kept forever, as "wild lands." This clause, which has never been repealed, prevents putting these State lands to their best use. Forestry cannot be practiced without cutting trees, and this is particularly true in the Adirondacks, where overmature stands of hardwoods need to be removed in order to establish a more valuable growth of coniferous species. If the State foresters were permitted to han-

dle these Adirondack lands according to forestry principles, they would be able not only to greatly improve the forest conditions, but secure an income for the purchase of more lands or with which to reimburse the State treasury for expenditures already made.

During the last ten years this constitutional amendment has been set aside by the Commission to the extent of planting up some of the burned-over areas, while more recently permission has been granted by the Legislature to remove trees from burned areas in order to reduce the fire danger. Under the existing conditions, it follows, therefore, that the work of the State at present is mainly along the lines of reforestation and fire protection, and since this work is being carried on in a very extensive way and very efficiently, it constitutes a matter of more than usual interest.

It may be added that the initial conception of planting Adirondack lands came from Dr. B. E. Fernow, while he was Dean of the New York State College of Forestry, and the first forest nurseries in the State were started by him in connection with the College demonstration forest.



Photo by R. E. Gooding.

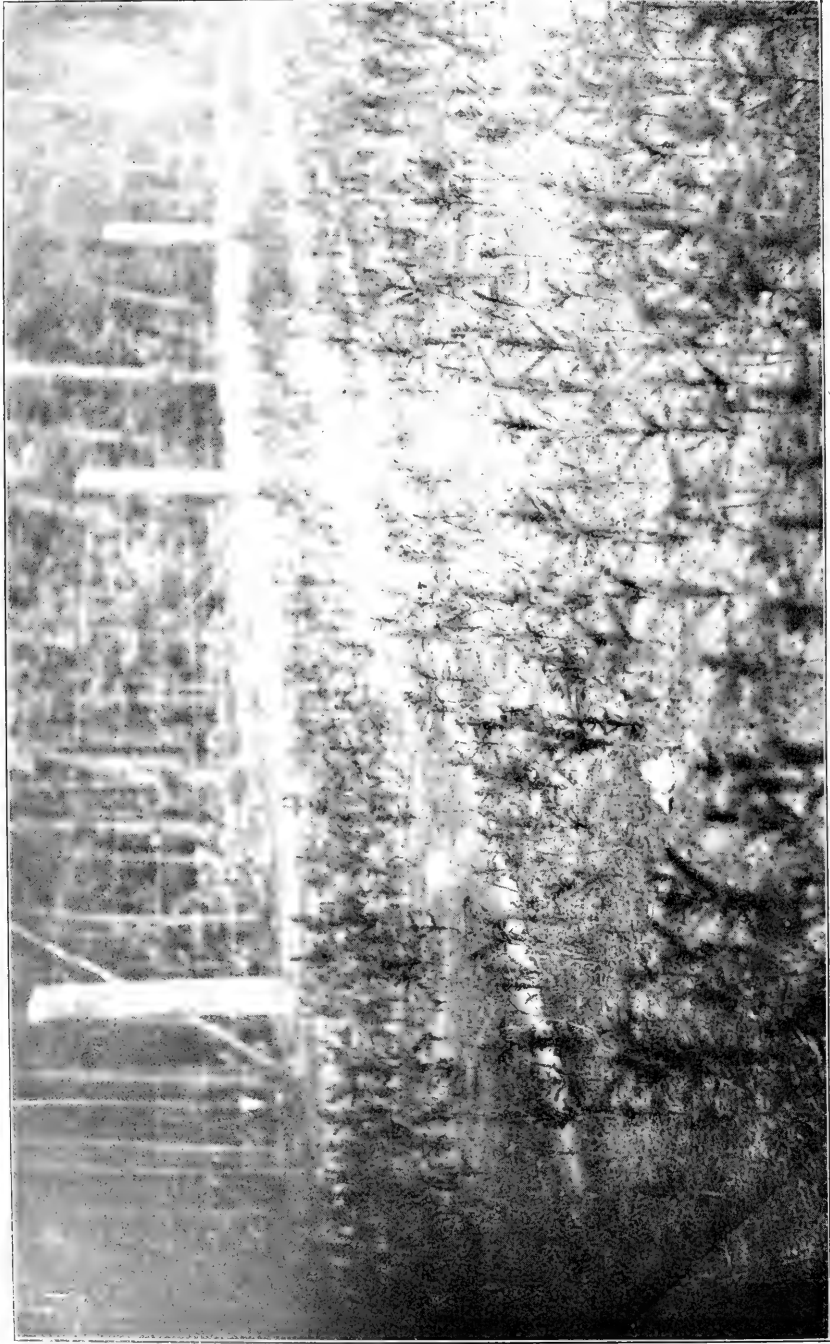
PORTION OF LAKE CLEAR NURSERY, LAKE CLEAR JUNCTION, N. Y.

The first forest planting on State land was done in 1901 in the Catskills. No appropriation for such work had been made, but A. Knechtel and R. C. Bryant, newly appointed State Foresters, secured a gift of 500 white pine and 500 Norway spruce transplants from the nurseries of the New York State College of Forestry at Axton in the Adirondacks, and set them out with help furnished voluntarily by residents near Phoenicia in the Catskills. It is interesting to note that these trees were grown originally in Germany, shipped to this country as seedlings and put out in transplant beds in New York. It also happened that when the first nurseries were started in connection with the Cornell demonstration forest, white pine seeds were not available in this country, where this tree at the time was king of lumber woods, but they had to be obtained in Germany from white pine forests started from seed obtained in America over a century before.

From the humble beginning made in 1901 with a thousand trees, the State reforestation work has grown until this year over five million trees were shipped from the State nurseries. In the fall of 1901 an additional 5,000

trees were planted but extensive operations did not begin until the following spring. During April and May, 1902, nearly 600,000 seedlings and transplants were set in permanent plantations in the vicinity of Lake Clear Junction in the Adirondacks, this being the largest planting operation undertaken by State, Federal or private enterprise up to that time. The plant material was procured from the College of Forestry nurseries at Axton and Wabeek, and was made up of Scotch and white pine, Norway spruce and European larch. It is significant that the pines have made the best growth during the ten years the plantation has been established, being now a solid forest of trees 10 to 15 feet high. The spruce succeeded only on the better lands and proved unsuited for the more sterile burned-over areas. This should carry a lesson to the pulp and paper companies who are desirous of reforesting with spruce, and show the necessity of promptly replanting logged areas before repeated fires have impoverished the soil.

During the years since the planting was started the work has gone ahead with rather fewer breaks than are to be expected when legislative appropri-



IMPORTED NORWAY SPRUCE TRANSPLANTS.
(Note large loss and poor condition.)



NORWAY SPRUCE TRANSPLANTS GROWN FROM SEED AT SARANAC NURSERY. *Photo by R. E. Gooding.*



Photo by J. W. Stephen.

PORTION OF SALAMANCA NURSERY.

ations have to be depended upon. The operations have proceeded along the accepted lines and also included a large number of experiments in broadcast sowing, seedspot planting, etc. In all a total of about 6,000 acres of waste land in the Adirondacks have been reforested, and under the present management it can be expected to develop along lines of even greater efficiency and magnitude. The present Conservation Commission is active along various lines; while Clifford R. Pettis, who as State Forester built up the state nurseries, is now Superintendent of State Forests and in charge of all work relating to the State forest lands.

In 1902 a nursery site was selected at Saranac Inn Station and during the next two years it was fully developed and greatly increased in size. Since that time two additional nurseries have been developed near Lake Clear, one at Salamanca, one at Saratoga, and this year a new one is being started at Comstock where convict labor will be used. In these seven nurseries over ten million trees will be produced annually for planting State land and for distribution to private land owners. During the past four years over 1,500

shipments have been made to private owners for reforesting their own land, the sales this spring alone approximating four million trees and the supply has never been adequate for the demand.

We, therefore, have within a night's ride of New York City the largest and best organized reforestation operation ever attempted in this country outside of the Federal government. The task is the reforestation of millions of acres of waste land which would never have any value for agriculture, and the creation of an asset to replace a liability. The reward will be in the benefits which will accrue to the State and the people in the form of timber and watershed protection for all time to come. It is a work which should inspire enthusiasm on the part of wood producer and wood consumer alike, and should have the support of everyone who has any spirit of patriotism. The reforesting of these enormous waste areas—and New York State has about 3,000,000 acres of such land or nearly 10% of its total area—is being done in the best and only way possible. The lamentable phase of the situation is that it should never have been

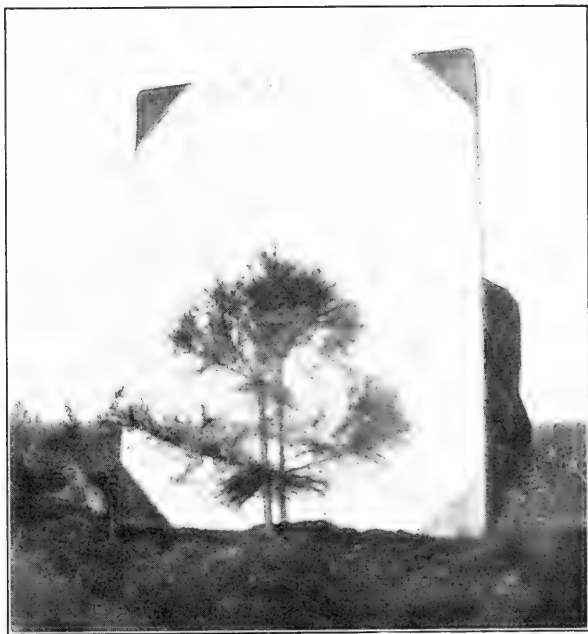


Photo by F. J. Rogers.

WHITE PINE TRANSPLANT SAME AGE AS TREE IN
ADJACENT PICTURE, BUT PLANTED IN THE OPEN.



Photo by F. J. Rogers.

WHITE PINE TRANSPLANT TWO YEARS AFTER
PLANTING SHOWING GROWTH OF ELEVEN
INCHES. THIS TREE WAS PLANTED UNDER
LIGHT SHADE.



Photo by R. E. Gooding.

FIRST SEED BEDS PATNODE NURSERY, LAKE CLEAR JUNCTION.

necessary to plant trees on a large percentage of this area, because natural reforestation would have reclothed the ground if even reasonable care had been given in lumbering, and if adequate protection from fire had been afforded.

There is another forest planting problem in the Adirondacks which is entirely aside from the replanting of areas denuded by lumbering and fire. The original forests were a mixed growth of hardwoods and conifers. The conifers, first the pine and later the spruce and balsam, have been removed over hundreds of square miles because they early had a market value. On these areas the old hardwoods which were left have closed in and usurped all of the growing space.

These hardwoods are now coming into their own and have a value which justifies their removal. From the standpoint of good forestry, common sense, and cold, callous commercialism they should be cut and replaced promptly with the more valuable, faster growing softwoods. This was preached years ago but it was not taken very seriously until recent demands made the logging of hardwoods a profitable

operation under certain conditions. Men familiar with the hardwood business now believe that the hardwoods in the Adirondacks should be cut and softwoods substituted. On a financial basis this policy is justified because the value of hardwood stumpage per acre is about equal to the cost of replanting with conifers. This being true there is no loss if the lumbermen cut their hardwoods and replant, the investment remaining the same if the profit from the hardwood is reinvested in young plantations. In the one case the owner would have an over mature hardwood forest, depreciating because of age and decay. On the other hand a fast growing young forest of valuable species worth at maturity, even at present prices, many times the value of the old hardwood stained.

The only strong opponents of the cutting of the hardwoods and their replacement by young trees of high value are the wealthy residents down the State who use the Adirondacks as a hunting and recreation ground. Their motives are selfish, narrow and unworthy of good citizens, their only excuse being that they do not fully understand the situation. The Adiron-



Photo by R. E. Gooding.
PORTION OF SARANAC INN NURSERY.



Photo by C. R. Pettis.
NORWAY SPRUCE SEEDLINGS IMPORTED FROM GERMANY. OUT OF A
SHIPMENT OF 500,000 TREES LESS THAN 20,000 COULD BE USED.

dacks would hardly be cut over and replanted in a day, the transformation would be so gradual as to be hardly noticed, and a great improvement would be effected in the end. The change is needed but public sentiment is a curious thing and is not easily persuaded.

The work of fire protection in the forests of New York State is another story, but it should be said in connection with the reforestation work that the men who are in charge of the State's natural resources realize that the extensive planting now being done will go for naught unless fire is absolutely eliminated from the plantations. The present fire protective system is one of the best in the country, and under normal conditions can be depended upon to save not only the plantations but such remnants of the original forests as remain.

An object lesson, such as is being given by New York, is needed in many other States, in fact some of the States are not far behind. Through the efforts of the American Forestry Association a party of lumbermen and public-spirited business men visited the Adirondacks in early May of this year and saw for themselves the work which is going on. If they did not learn a valuable lesson it was their own fault, and there is every reason to believe that they went home in a new frame of mind and with a much keener appreciation of the relationship of the timber-land owner to the State, and of the work which the State in turn is doing to undo what commercial necessity and carelessness—not riotous greed—had previously done.*

*Photographs by courtesy of the New York State Conservation Commission.

RETURNING LAND TO IDAHO

TO permit the State of Idaho to obtain land in lieu of 90,000 acres of school lands included in National Forests prior to survey, President Taft has eliminated about $4\frac{1}{2}$ Townships from the St. Joe National Forest. These lands will be held and managed as a permanent State forest. This action by the President carries out an understanding which was reached with him by Governor Hawley and other representatives of the State of Idaho about a year ago. The State had tried to make indemnity selections for various school sections lost to it through the creation of National Forests, but before the acceptance of the State's filing the intended indemnity selections also were included in National Forests. To learn what relief could be obtained Governor Hawley decided to go to Washington and take the whole matter to the White House.

Under this agreement the State has undertaken to retain a designated body of land permanently for forest purposes, provided the Government would permit title to be acquired. The area designated comprises largely though not entirely the lands for which the State made its original application. This 90,000-acre tract will, under the agreement reached, be protected by the State against fire and other destructive agencies, and administered similarly to the National Forests. Timber will be sold only under such stipulations as will insure reproduction of the forest, and favorable streamflow conditions will be maintained through preservation of the necessary forest cover. The elimination now made by President Taft permits the carrying out of the arrangement, so far as concerns acquisition of title by the State.

A NEW FORESTER.

Irving Southworth, of Johnstown, N. Y., who has recently finished a course in forestry, and has traveled extensively through the south, west and also in Germany, has secured a government position on the Blumas reservation, California.

THE DISMAL SWAMP OF VIRGINIA*

By ARTHUR HOLLICK

THE Dismal Swamp, usually called the Dismal Swamp of Virginia, lies partly in Virginia and partly in North Carolina; but it is more accessible from the former, and as most of those who have explored or visited it have entered from the Virginia side, the name of that State is commonly linked with it. Its topographic, geologic, biologic and economic features may be found described in numerous governmental reports; many historical events are connected with it; it figured more or less prominently in certain events of the Civil War, and it has been made the subject of numerous articles, stories and traditions published in works of fiction and in magazine and newspaper literature.

The area of the swamp is about 1,500 square miles. The surface is almost level, sloping gradually from the southwest toward the northeast, with an elevation above mean tide level of from 23-12 feet, and in consequence, the drainage is so imperfect that, throughout most of its extent, it remains constantly inundated. Certain portions, however, become more or less dry in periods of drought, and quite a large portion of its former area—some 700 square miles along the eastern border—has been permanently reclaimed in recent years, by means of drainage, ditches and canals.

Near the center lies Lake Drummond, an almost circular body of fresh water, about $2\frac{3}{4}$ -3 miles in diameter, with an almost uniform depth of about 6 feet. The surface is now about 22 feet above mean tide level; but previous to the completion of recent drainage operations it was somewhat higher.

The lake may be reached by means of any of the several artificial channels which have been cut through the swamp. Washington and Jericho ditches are only navigable at high water, by small boats or canoes, which have to be poled carefully and more or less laboriously, by reason of the vegetation which has grown into the sides, and the trees which have fallen across in many places, during recent years. In

periods of drought these ditches often become dry and may be used as foot paths or trails.

The Dismal Swamp Canal, however, is a permanent, broad artificial channel, which will probably be made a part of the great interior waterway which is planned to extend from New Jersey to Florida. It is navigable for steamboats of small size and is sufficiently wide for steamboats and barges to easily pass each other. The "feeder," by means of which it is connected with Lake Drummond, is also a wide channel, navigable at all times for row boats, motor-boats, etc., as far as the upper lock, within about three-fourths of a mile of the lake. This lock controls the water of the lake, and a lower one, at Deep Creek, controls the entrance to the canal at tide-water.

During the past year I was fortunate in being able to visit the swamp under unusually favorable conditions, as one of a party all of whom were guests of the Lake Drummond Canal Company. The company provided transportation from Norfolk, by steamboat, up the canal to the mouth of the feeder; thence by large rowboats, towed by a motor-launch, up the feeder to the lock near Lake Drummond, where a camp site had been prepared on the bank of the feeder, and tents and two days' supply of provisions provided. This site was perfectly dry, in a partly cleared area on the border of the forest and was admirably adapted for the purpose. One night was spent there and the following day Lake Drummond was navigated in rowboats, to the mouth of Washington Ditch, where a transfer was made to smaller boats, which were poled up the ditch to Suffolk. From thence the trip back to Norfolk was made by rail. The swamp was thus traversed from one side to the other; two days and a night were spent there, and unusual opportunities for observation were enjoyed.

The camp site had been covered with a dense growth of "cane brake" (*Arundinaria macrosperma*), but a large area was cleared for our accommodation.



CAMP SITE ON BANK OF "FEEDER," NEAR LAKE DRUMMOND.



BALD CYPRESS, SHORE OF LAKE DRUMMOND.



SUNSET, LAKE DRUMMOND.



WASHINGTON DITCH.

This grass is an exceedingly characteristic feature of the swamp, forming dense thickets and growing to a height of six or eight feet. The adjacent forest consisted largely of red maple, persimmon, sour-gum, willow-oak, ash, and magnolia, with scattered trees of yellow pine, white cedar and bald cypress. One of the most abundant and striking features was the "jassem-in" (*Gelsemium sempervirens*), whose clusters of fragrant, yellow flowers were to be seen everywhere, entwined in the undergrowth.

At night the scene in the vicinity of the camp was rendered wierdly beautiful by the glow of "fox-fire" on the stumps of the trees and in the débris of the forest floor. I had often seen this phenomenon in other localities, but never before to the same extent or brilliancy. The phenomenon is caused by certain fungi, especially in the genera *Panus*, *Clitocybe*, and *Armillaria*, and also by many bacteria; but its nature is not thoroughly understood. It is commonly spoken of as "phosphorescence"; but this is a misnomer as it is not due to phosphorus but to the process of oxidation. A better term to use would be "luminescence."

Undoubtedly, however, the bald cypress (*Taxodium distichum*) is the most striking feature of the swamp. These trees never fail to excite the wonder and admiration of every observer, especially when seen for the first time. The massive buttressed base; the peculiar processes known as "knees," which rise from the roots; the tall straight trunks, and the delicate, feathery foliage, mark these trees

as unique in our modern flora. In many respects they resemble the redwoods and giant sequoias of the Pacific coast, and, like them, they represent the type of a genus which reached its maximum of development in past geologic ages and is now on the highroad to extinction. The bald cypress will grow in high, dry ground; but its natural habitat is in swamps. It thrives and flourishes under conditions which would be fatal to most other trees, with the roots permanently immersed and often with the base of the trunk entirely surrounded by water. Splendid examples are to be seen on the shores of Lake Drummond, where they constitute almost the sole feature of the outer zone of the lake border vegetation. Many individual trees, isolated from their fellows, grow well out in the lake, constituting one of its most striking features.

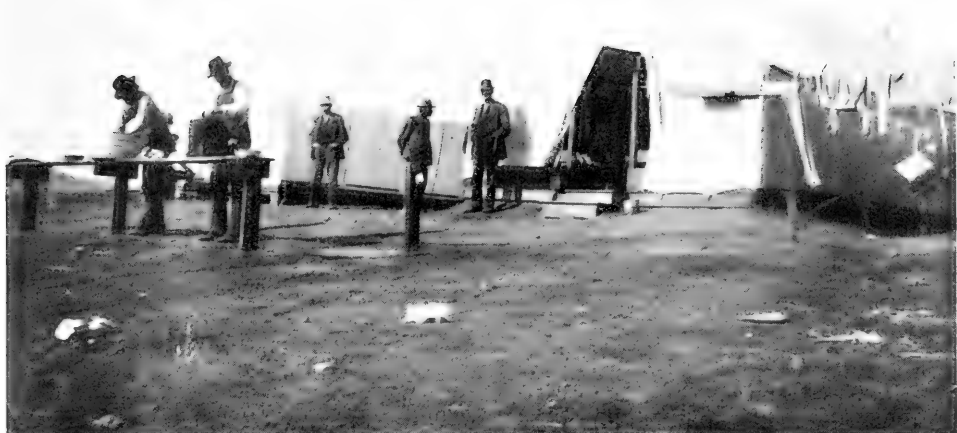
The water of the swamp is dark-colored, but clear, resembling strong tea, and has an acid reaction and remarkable antiseptic properties. It is palatable and wholesome and keeps wonderfully well, without becoming foul. In former years it was much used on ships, especially on those about to make long voyages. That from the white cedar areas, known as "juniper-water," was considered the best. Even where the ground is saturated, and the water stagnant, there is an entire absence of the odors which are generally noticeable in salt marshes and in many fresh water swamps where there is abundant decaying vegetation.

*Article and pictures by courtesy of the Journal of the New York Botanical Garden.

AN EXPLANATION

IN justice to Mr. Theodore S Woolsey, Jr., who contributed an excellent article on the Harvard Forest School for the April number of AMERICAN FORESTRY, the editor desires to explain that owing to lack of space it was impossible to use the carefully and skillfully tabulated statistical tables by which Mr. Woolsey showed

the actual results obtained with various trees under different conditions, and made a number of yearly comparisons which would have been of great interest to the student. The editor regrets that it is necessary, owing to lack of space, to eliminate statistical tables from most of the articles submitted which contain them.



SUNDAY AT THE CAMP OF THE UNEMPLOYED, SAN DIEGO, CAL., MUNICIPAL FOREST.

SAN DIEGO'S MUNICIPAL FOREST

BY MAX WATSON, *Public Forester*

NOW that the United States is realizing that period when it becomes expedient to look forward to its future timber supply and the fact becomes apparent that within less than a decade it will be necessary to create forests to fill the demand which cannot be supplied by our fast diminishing forests, it is rather interesting to note the manner in which this future want will be provided. Of all the natural resources which are primarily a public asset, there is none on which the public well being is more dependent than the forests. Therefore it follows that our future forests should be established by the community as a whole rather than by its individual citizens for the benefit of the individual and not the community.

Several of the cities of Europe have furnished us with creditable examples of what a community may accomplish through the establishment and maintenance of a Municipal Forest, but until

recently such an undertaking had not been attempted by any city of the United States. That the City of San Diego, situated in the most southwesternly corner of the United States, should be the first to systematically establish a Municipal Forest, might seem rather extraordinary at first glance to those familiar with Southern California, and the natural flora of that region. The country is bare of any natural forests except upon the highest mountains, and the limited rainfall would seem to be adverse to an undertaking of this kind. Nevertheless the fact that this city is now engaged in such a work indicates that there must be conditions which make such an undertaking within the realms of practicability.

The first and most important reason is the fact that San Diego stands apart from other cities in that she is the possessor of nearly seven thousand acres of land within her limits. This land came into the possession of the



VIEW OF A SECTION OF ONE-YEAR-OLD GROVE, SAN DIEGO, CAL., MUNICIPAL FOREST.

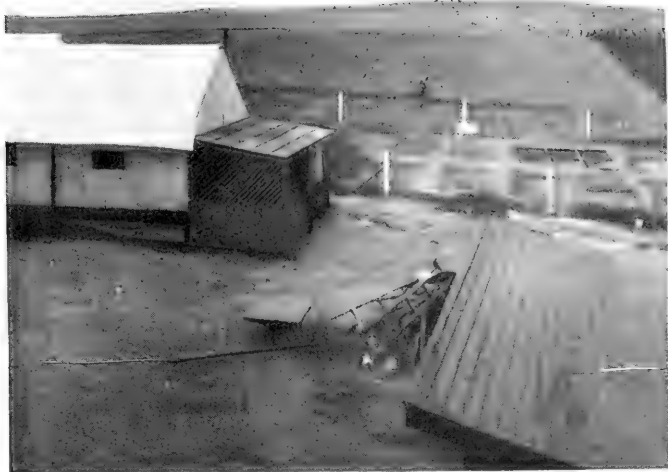
city at the time California became a State, when all of the old Pueblo of San Diego was deeded to the city by the National Government. Thus, San Diego became the owner of practically all the land within its limits, but the greater portion was sold during the early days until only the seven thousand acres now in its possession remained. The land is located ten miles north of the city proper. For the most part it is what is known as mesa land, lying about three hundred feet above the sea. It is rather rolling, and traversed at intervals by deep canyons, running to the sea. The virgin covering of this section consists of the native grasses and characteristic chaparral of Southern California; the largest growth on the mesa land being the Sumacs (*Rhus Laurina* and *Rhus Integrifolia*). For the most part the soil is of a sandy nature varying in depth from two to twelve feet. The mesa soil is underlain with a sand hardpan which is not impervious, and can be penetrated by roots if sufficiently moistened.

Being the possessor of such a tract, the city had the land upon which to

establish a forest, but before such a thing became possible it was necessary also that there should be a tree, which was adapted to the soil, and climatic conditions, and which was of commercial value. In selecting a tree for the creation of a forest there are three main factors upon which the selection of the species is determined. First: The timber produced must be adapted for general use. Second: The species must be suited to the soil and climate of the location selected. Third: The tree must be the one which will come to maturity in the shortest possible time.

Southern California has in the Eucalyptus a tree which fills these requirements completely. The Eucalyptus is an acceptable substitute for almost any of our American hardwoods. It is adapted to the climate of Southern California even better than to its native land, and its rapid and thrifty growth in this locality is unsurpassed by any tree in the world.

When the charter of the city of San Diego was revised in 1908, the possibility of the establishment of a successful Municipal Forest upon the Pueblo



LOOKING ACROSS CITY LANDS TO THE SHORE; NURSERY IN THE FOREGROUND. SAN DIEGO, CAL., MUNICIPAL FOREST.

Lands was realized by some of the far-sighted citizens, who secured the insertion of a clause, which exempted these lands from sale until 1930, and provided a tax of two per cent per hundred on the assessed valuation of all city property for the improvement of these lands.

No further action was taken until the fall of 1910, when a Pueblo Forester and Assistant were appointed with instructions to establish a headquarters upon the land, and plant forty thousand trees, as the beginning of a municipal forest. The necessary buildings were erected and implements purchased and a water system installed for domestic purposes for the establishment of a nursery for propagating the trees to be planted.

The rainfall in this section is only ten and one-half inches, and is distributed entirely through the winter months. With such a limited water supply it was necessary to utilize a system of dry farming for conserving the moisture during the summer months, and thereby assisting the trees in developing to the fullest extent.

The land selected for the planting is thoroughly plowed immediately after the first rains to a depth of about ten inches. The rainfall is conserved during the winter by harrowing, and the ground worked into proper condition for the planting, which is done in March and April. The field is laid off in eight foot squares and the trees planted at each intersection. The planting is done with an ordinary garden trowel,



LOOKING ACROSS ONE YEAR'S GROVE TOWARDS FARM BUILDINGS, SAN DIEGO, CAL., MUNICIPAL FOREST.

and the trees, which are about one foot in height, set into the ground about four inches so as to be well into the moist earth. No water is used in the planting, and none afterward. After the trees are planted they are cultivated until a thorough dust mulch is established. This requires about five cultivations extending up into June when no more care is necessary until the rains of the next winter. In the following spring a mulch is again formed by stirring up the ground between the trees. After one year's growth many of the trees are ten feet in height with a diameter at the base of fully two inches. Trees set upon the same soil without cultivation have not equalled this growth in two years' time.

After the first year's planting was completed a nursery was established with a capacity of several hundred thousand trees a year for carrying on the work. The trees grown for the 1912 planting included about seven species of *Eucalyptus* and a few species of *Acacias*; numerous ornamental trees were also propagated for use along the drives and boulevards. Among these were a few thousand of the Torrey Pines (*Pinus Torreyana*), which were grown for enlarging the grove of these trees which is located upon the city land. With the exception of a few trees found upon one of the coast islands these are the only trees of this species in existence. About two hundred and fifty acres have been planted

during the spring of 1912, making three hundred acres now in trees. These trees will make a growth of about eight feet per year, and in three years' time should be of sufficient dimension to be available for fence posts. At this time the trees will be thinned, leaving not more than two hundred trees per acre to come to maturity as timber trees.

It was not until the active development of this land had been undertaken that its actual value for various usages was appreciated. It was seen that, lying as the greater portion does, with the mountains on one side and the Pacific on the other, with the rapid growth of the city this land would soon become reservable as sites for suburban homes. Many acres are also well adapted to intensive farming for the growing of small fruits and vegetables and could be subdivided and leased for this purpose to good advantage. A good portion of this agricultural land has been planted to grain for the use of the farm stock and that of the different departments of the city. For this reason it was decided to confine the planting to that portion of the land not so well suited to general agricultural or building purposes. As far as possible the planting will be confined to the canyons and hillsides, and the less valuable land. In planting on the steep canyon sides it is impossible to follow the method described, but as far as the land will permit the fullest prop-

agation will be given. Practically all the land so far planted is under cultivation.

The development of a Municipal Forest and Farm afforded a splendid opportunity for the city to take steps toward solving some of its most vexing social problems.

The idea first advanced was for the institution of a plant for sending the vagrants and habitual drunkards of the city to the farm on probation for a term of a few months; the drunks to first be given a drug cure to eliminate as far as possible the desire for drink. A camp was first established, however, mainly for relieving the unemployed of the city, although many have been sent from the Police Court. The men have been given employment, each at fifty cents per day and board. This plan has proven a complete success in every particular. Hundreds of men have been benefited by the clean, wholesome work afforded, and all the planting this spring has been done with this labor with good results. It is doubtful if a better plan could be devised for the solution of these problems in any city than the establishment of a Municipal Forest and Farm, and the employment of these men under such a plan. A Municipal Forest is a good business investment, and the useful employment of a class that has to be supported by the city directly or indirectly is also a good investment for the taxpayer.

LUMBERMEN HELP FORESTERS.

W. T. Cox, Minnesota state forester, reports that co-operation received from lumbermen in the northern part of the state has been such as to do away with forest fire dangers. He said that town officials and residents have also assisted. The heavy rains of the spring have done much to keep fires from starting in the woods.

FOREST PRODUCT STATISTICS.

The Forest Product Statistics of New York State for the year 1911, gathered by the Conservation Commission, show that the lumber and pulpwood output exceeded that of the preceding year, but that there was a falling off in wood used for alcohol, excelsior and cooperage.

The output of the forests in 1910 showed a decrease of 25 per cent from that of 1908; a decline of about 300,000,000 feet in three years. The annual removal of about one billion feet of wood material from the forests and woodlands of the state cannot go on indefinitely without reforestation on a large scale.

FIRST PURCHASE OF WHITE MOUNTAIN LANDS UNDER THE WEEKS LAW

THE purchase of 30,365 acres of land in the White Mountains of New Hampshire was authorized on June 19 by the National Forest Reservation Commission. The land is to be purchased under the Weeks Law which provides for the acquisition of lands by the Federal Government on the headwaters of navigable streams. A report previously rendered by the Geological Survey showed that these lands were of importance in protecting the flow of the Connecticut and Androscoggin Rivers.

The lands purchased include a tract of 29,570 acres at \$8 an acre, owned by the Berlin Timberland Company of Berlin, N. H., acreage to be determined by a horizontal survey to be made by the United States. The Commission also authorized the purchase of 795 acres belonging to Mrs. E. M. Libbey, of Littleton, N. H. This tract consists of an undivided interest in certain lots owned with the Berlin Timberland Company and forming a part of the tract purchased from that company.

The land purchased consists for the most part of valuable timber-producing lands on the north slopes of the Presidential Range. In addition to their value for their standing timber and for timber production they have other important advantages which make them among the most desirable of any in the White Mountains for the purposes of the Weeks Law. The tract has been carefully protected from fire for a number of years so that the ground where the mature timber was removed a number of years ago is now fully restocked with a good quality of young growth.

The nearness of all parts of the tract to the railroad adds materially to its advantages. Due in part to its nearness to railroads and in part to its natural scenery this tract is undoubtedly one of the best known of any in the White Mountains, containing many of the most prominent features of the vine, The Ravine of the Cascades, and

White Mountain region. Kings Rattle the Castellated Ridge are all on this tract, and it also affords many commanding views of the high peaks of the Presidential Range. During the past thirty years the Appalachian Mountain Club has developed a network of trails on the north slopes of this range, a greater portion being on this tract. Thousands of persons tramp these trails every year. It was considered by the Commission that in no other part of the White Mountains would the educational effect of a demonstration in forestry be so great.

The Connecticut River is by far the most important navigable stream originating in the White Mountains and three-fourths of this tract drains into that stream.

With the lands authorized for purchase at the meeting of the Commission a week previous authority has now been given for the acquisition of 72,000 acres in the White Mountains.

The land first purchased was what is known as the Bean Purchase, lying just east of the Carter Range and being the watershed of the Wild River. This comprised 33,800 acres at \$5 an acre and was the property of the Hastings Lumber Company, while 7,500 acres in Bethlehem and Franconia belonging to the Berlin Mills Company was bought at \$4 an acre. The Bean Purchase was swept by fire in 1903 and 9,000 acres damaged, but since then it has been well protected, and is considered by the Forest Service officials to be a valuable acquisition.

Options have been secured on 20,000 acres in Benton and Easton and Chief Forester Henry S. Graves left on June 20 to make a careful examination of them. He was joined by expert lumberman Eugene S. Bruce, of the Forest Service, a few days later. More or less other land has been offered and is desired, but the Forest Service officials consider that the price asked is too high.

FAVORABLE TO WHITE MOUNTAINS

WHAT the forest cover of the White Mountains has a distinct and measurable effect upon the navigable streams which head in that region is the unequivocal and emphatic statement of the United States Geological Survey. The Director of the Survey has filed his preliminary report on the White Mountains with the National Forest Reservation Commission, and, as earlier announced, the findings are favorable to the purchase of lands under the Weeks law.

The report of the Geological Survey is based on the results of exhaustive investigations and specific field tests which have been carried on during the last year. While the Survey has been subjected to frequent criticism and even bitter attacks, owing to its refusal to submit a perfunctory report assuming that a known and definite relation exists between forests and stream flow in the White Mountain region, the outcome of its investigations must not only satisfy the most radical forest enthusiast, but it precludes the possibility of criticism by those who have opposed the acquisition by the Government of any forest lands, on the theory that forest preservation does not affect stream flow. The investigations are believed, indeed, to solve definitely a problem that has long been a source of strenuous contention among scientists, including the friends of forest conservation, and while these investigations have direct reference to the entire White Mountain area, they establish a principle which is of far wider application.

The Weeks Forest Reservation Law places upon the Geological Survey the responsibility of establishing, before purchase, the fact that forest lands have an effect upon the navigability of navigable streams, and the law provides that the Survey shall make a field examination of every tract offered to the Government for sale thereunder. The Survey has insisted on following the plain mandate of the law and making such examinations, not at an office

desk but actually on the ground, in a thoroughgoing, scientific manner.

In the southern Appalachian Mountains tracts aggregating 1,962,800 acres have been certified to by the Geological Survey as affecting the navigability of streams by reason of the excessive erosion which follows deforestation in these areas. Owing to the geologic conditions in the White Mountains, no excessive erosion, according to the Survey geologists, can be shown to follow deforestation. Therefore the Survey carried forward its further investigation in the White Mountains along the lines of trying to show that deforestation and subsequent burning of the forest mulch results in a more rapid run-off and therefore tends to make unstable the flow of streams.

The hydrometric showing presented in the preliminary report covers results on two small, almost exactly similar drainage basins of about 5 square miles each, on the east branch of Pemigewasset River, one largely clothed with virgin timber and the other deforested and burned. The facts observed are so striking as to render the position of the Survey impregnable. Careful measurements of precipitation over the areas and of the run-off of the respective streams show that not only was the snow held better in the forested area, but that during a period of 17 days in April, including three extended storms, the run-off of the stream in the deforested area was a comparative flood—practically double that of the stream flowing through the forested area, as shown graphically below.

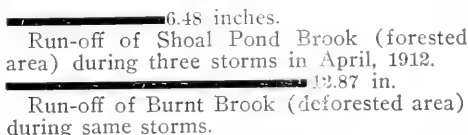


Diagram comparing run-off from forested and deforested basins.

In the Shoal Pond Brook basin (the forested area) the Survey established

7 rain gages and 20 snow gages and the engineers visited these continually during the winter on snowshoes, the snow being from 4 to 7 feet deep; in the adjoining Burnt Brook basin (the deforested area) it established 9 rain gages and 18 snow gages. On both streams hydrometric stations were established and the stream flow determined with a high degree of accuracy. The Survey report shows that the maximum flood flow from the forested basin was only 67 per cent of that from the deforested basin.

During the period of these storms Burnt Brook (deforested) contributed a much greater volume of water to Pemigewasset River than did Shoal Pond Brook (forested). "The stream of the forested basin is observed to be the steadier of the two and in proportion to its drainage area it tends—at least during the spring months—to promote a steady flow of water in the master stream of which it is a tributary."

The conclusions of Director George Otis Smith, of the Survey, are as follows:

"The comparison between two adjacent basins during critical periods is presented in this preliminary statement as a sufficient showing for the purposes of the National Forest Reservation Commission. While data covering longer periods for both these and other basins in the White Mountains have been collected and will be available for the more complete report, the particular case of the Burnt Brook and Shoal Pond Brook basins is typical for the region and establishes the general conclusion that a direct relation exists between forest cover and stream regulation.

"The results of the Burnt Brook-Shoal Pond Brook studies are held to show that throughout the White Mountains the removal of forest growth must be expected to decrease the natural steadiness of dependent streams during the spring months at least.

"The foregoing conclusion forms a strong basis for arguing the desirability of painstaking methods of administration in respect to forest lands in the White Mountain region. Defores-

tation followed by fires, as in the Burnt Brook basin, results in conditions unfavorable to natural spring storage because conducive to rapid snow melting and stream run-off. Control of White Mountain lands that would reduce fires to a minimum and promote normal reforestation must result in a great improvement over present tendencies, and this improvement in forest cover can logically be expected to favorably affect stream regulation to the extent quantitatively indicated in the comparison of the forested Shoal Pond Brook with the deforested Burnt Brook.

"While the intensive hydrometric work was confined to a few headwater tributaries of the Connecticut and Merrimac rivers, the basins studied were selected as typical for the whole White Mountain area, and the field examinations over this region have shown the tracts now under consideration for purchase to be similar to the basins here reported upon. Therefore, the favorable showing of this report is of general application in the White Mountain area."

Such an actual demonstration and quantitative measure of the performance of different areas, some forested and others deforested, has never been attempted in trying to determine the effect of forest cover on stream flow. Efforts to arrive at definite conclusions have always been based on a study of long-time records of precipitation and stream discharge; but owing to the many qualifying factors, such efforts have simply resulted in divergent opinions and inconclusive controversies. The results of the present actual measurements in these mimic drainage basins, so accurate and refined in method as to approach laboratory experiments, where exact results may be expected, leave no doubt as to the conclusion. Forest cover and the resulting forest mat in the White Mountain granite area does, to a considerable and measurable degree, steady and regulate stream flow, and therefore must be stated as an important factor in maintaining the navigability of streams whose headwaters lie in such areas.

RAISING ELK AND DEER

MUCH interest has been manifested by readers of *AMERICAN FORESTRY* in an article on Raising Deer on Forest Preserves and a number of inquiries have been received regarding cost, method of feeding, etc.

The following extracts from a letter by Howard Eaton, a dealer in wild animals, of Wolf, Wyoming, to Wm. M. Ellicott, of Baltimore, who worked for the passage of the bill by the Maryland legislature allowing the raising of deer for the market, gives many interesting details in reference to elk and deer raising.

Mr. Eaton says:

"You have done the right thing for Maryland in this deer and elk breeding matter, and it solves the question of how to use the cut over and bushy country which is not suitable for farming and hardly carries enough feed to fatten cattle, etc.

"I have shipped elk all over the U. S. and delivered a lot to Mrs. T. M. Carnegie, Cumberland Island, Fla. These elk did well as far as climate and altitude went, but were killed by some poison plant. Near N. O. I sold a lot and five years later heard that they had done very well.

"Mosquitos would not injure the elk or deer, as they have served their time with skeeters in Montana, Wyoming, etc.

"I can't remember altitude of Lake Superior, but a large lot of deer and elk are right along the shore, virtually at water level.

"Elk will browse and also graze. I've never known elk subject to any disease, except that in the Yellowstone Park some years since and many elk died of mange, much like the old buffalo mange, but I've not heard of any mange there since winter of 1902-3.

"I'd advise 8 ft. fence, although lower ones might answer, but the 8 ft. fences (Page woven wire is O. K.), would hold the elk and by stretching a wire 1 ft. above it would hold deer as well. The 8 ft. fence would hold antelope, elk, moose and buffalo.

"In Maryland, I'd consider shelter unnecessary, although you would or should have feed corrals or pastures, where game could be fed some in winter, making it tamer and allowing a count and view of the animals.

"Let the buffalo run all the year with the cows.

"Elk will kill dogs or run them out of pasture, especially when the elk calves are around. I saw a bunch of them corner a big Canada lynx and he was one of the worst scared animals I ever saw,—only saved his life by climbing a tree.

"You would not need goats with the elk.

"No special training is required to handle elk,—just good wild hog sense. If feeding hay at any time remember that elk and deer prefer weedy hay to clear timothy or alfalfa.

"In a small enclosure during rutting season, the bulls are dangerous—same as male deer at that season, but in a large park the elk will keep away from a man.

"A man on a horse would be immune from bulls, unless during the rut, he would corner an old fellow.

"The meat of the bulls is best out here up to about October 1st, although at times a bull will rut in September, by 15th to 20th.

"Cows are good at any time when in flesh—same as our domestic cattle. Bulls are good meat when they regain flesh after their horns are shed (usually in March this happens).

"I've never hesitated to go among the elk freely, afoot or in saddle, at any time except rutting season, but while it might be and is as a rule, safe to feed them salt from the hand, yet it is unwise to trust any mature wild animal—he seems to get locoed at times. I'll write Mr. Knorr and urge that the Agricultural Department co-operate with the Maryland Agricultural Station and try game raising, but you know that the Government is mighty slow at times. I have urged many times that the game be placed on cut over

lands of low value in Maryland, Virginia, West Virginia, and Pennsylvania.

"It is a great chance to make money easily. I have a friend in Iowa who kills his deer and tags them with a special permit, ships to Chicago, and nets about \$30 for does and \$35 for bucks. These animals cost him very little more than to raise a couple of

sheep—his income from deer in an 80-acre pasture is \$1,000 to \$1,100 per year for venison and \$300 to \$500 per year from sale of live animals.

"Except to feed in winter and to dress the meat, there is no work in raising and selling these deer.

"I've had nearly 40 years' experience in raising and selling wild animals and am fairly well posted.

A DEMONSTRATION FOREST

THE Board of Regents of the University of Washington, at their meeting April 24, on the recommendation of President Kane unanimously authorized the College of Forestry to co-operate with the United States Forest Service in the establishment and operation of a demonstration forest.

The College of Forestry has long felt the need of such a forest. While the general conditions about Seattle are perhaps better adapted for carrying out student exercises and demonstrations by the instructor than they are at any other school in the country, yet there are many problems that cannot be worked out successfully except on an area fully controlled by the College. Although this forest will be subject to the control of the United States Forest Service and a tract owned by the University would in some respects be more desirable this forest will open the way for the solution of many problems.

The object of the demonstration forest is two-fold. First. It will be used as an experiment station. The field of work in this line that is open in the Pacific Northwest is practically unlimited and the various problems to be solved have hardly been touched upon. Abroad forest experiment stations are common and they have contributed largely to the development and advancement of forestry. With the decrease in the available timber supply and the increasing interest that lumbermen and timberland owners are showing in reforestation, the general public is demanding information on the

best methods of handling forest lands for increased and continued production. It is one of the objects to use the forest to carry on experiments that will lead to a solution of these problems.

The second object of the demonstration forest is to make it serve as a field laboratory where the students in forestry may acquire at first hand a practical knowledge of all phases of forestry and lumbering. This is of especial importance to the students who elect the course in logging engineering. This course combines a knowledge of forestry and logging in such a manner that it will enable the student, after a period of apprenticeship, to take charge of logging operations.

The site for the forest will probably be selected during the coming summer. An entire water-shed readily accessible to the University will be chosen. When the work is put under way the students will be required to make a complete working plan, including a detailed cruise, topographic and forest type maps, valuation of timber, plan of logging, improvements, and tables showing growth and yield. All cutting will be done in accordance with the working plan in such manner that the operations are financially successful and at the same time that future yields will be increased and the forest generally improved. The details of all proposed plans will be subject to approval by the National Forest Service. All timber sales will be made in accordance with Forest Service regulations and the revenues therefrom will be entirely under government control.

THE FORESTRY CONFERENCE IN THE WHITE MOUNTAINS

THE program for the Fifth Annual Forestry Conference in the White Mountains, July 17-19, presents a number of interesting features. It is held under the auspices of the Society for the Protection of New Hampshire Forests, in co-operation with the New Hampshire Forestry Commission, and includes meetings of the Directors of the American Forestry Association, the North-Eastern Foresters, and the New Hampshire Timberland Owners Association. An outline of the program shows the excursions and visits to forest enterprises, and the subjects for discussion:

July 17, 10 a. m. Meeting at the Deer Park Hotel, North Woodstock. A visit will be made to the famous Lost River, which has recently been acquired by the Society for the protection of New Hampshire Forests, with 148 acres of timberland adjoining.

8 p. m. A meeting at the Deer Park Hotel, North Woodstock. Ex-Governor Rollins will preside. Addresses are expected from Governor Bass, of New Hampshire, President of the American Forestry Association, and Governor Plaisted, of Maine. Mr. W. R. Brown, Chairman of the State Forestry Commission, will outline the forest work in New Hampshire, followed by brief remarks by the State Foresters and other official representatives from the several New England States.

July 18. At Bretton Woods. 2 p. m. The Mt. Pleasant House. A meeting for the discussion of measures to prevent forest fires. Mr. W. R. Brown will preside. Brief papers will be presented from a number of persons who

have actually had experience in fighting fires. Mr. J. G. Peters will speak upon the co-operation of the federal government.

8 p. m. The Mt. Pleasant House. General conference upon conditions in the White Mountains. It is expected that members of the National Forest Reservation Commission will be present, together with representatives from the Forest Service and the Geological Survey. New Hampshire's purchase of the Crawford Notch. Experts have been invited to discuss the influence of the forest upon the flow of streams.

July 19. 9 a. m. The Mt. Pleasant House. Eleventh annual meeting of the Society for the Protection of New Hampshire Forests.

10 a. m. General conference upon forest taxation. Leaders in this discussion will be, Dr. B. E. Fernow, of Toronto, Professor Fred R. Fairchild of Yale, and Professor Charles J. Bullock, of Harvard, and the Foresters from the several States.

2:30 p. m. The Crawford House. A porch talk on the Crawford Notch purchase, followed by a walking trip into the primeval spruce timber on Mt. Webster.

Members of the conference will visit the State Forest Nursery at Boscawen, N. H. Headquarters for the conference will be at the Mt. Pleasant House, Bretton Woods, which makes a special rate of \$3.00 per day. The same rate to members of the conference is made by the Deer Park Hotel, and the Crawford House. The Mt. Washington Hotel also offers special rates.

CHINA'S MOST VALUABLE WOOD.

The nammu tree (Persca nam-mu Oliver) of the laurel family of plants yields the most valuable wood of China. It grows in the moist climate of western Szechuan, China, which lies between the 25th and 26th degrees north latitude. This is in about the latitude of New Orleans and attempts are now being made to grow this valuable tree in this country.

STATE FOREST PROBLEMS IN MARYLAND

BY F. W. BESLEY, *State Forester*

NOT many years ago the Federal Government was practically the only agency for organized forestry work in this country. Since then, however, not less than twenty-seven States have taken up the practice of forestry in a more or less systematic way and are at the present time expending over a million dollars annually in the effort.

When we recall the many years of hard fighting by a few men whose names are familiar to all of you, that was required to establish a forest policy for the Government upon the millions of acres that the Government owned, it is not surprising that the States have been unseemingly slow in adopting a forest policy which involved lands owned by private individuals who have little or no interest in this general problem of forest conservation. Herein lies one of the chief difficulties and accounts in a large measure for the slow development of forestry in the states. Few states have large holdings of forest land upon which they are free to practice forestry without restriction. Practically all of the land is held by private individuals who can only be appealed to by showing them that the practice of conservative forestry will pay and in face of the fire risk, the low value of stumpage, the haphazard system of taxation, and lack of reliable data as to what may be financially expected, this is difficult to figure out to the satisfaction of the landowner. At the same time the landowner will continue to hold his land in timber growth, and is generally willing to adopt means for greater protection and measures to improve growth conditions when such improvement does not involve much of an outlay. This opens up a wide field of usefulness which the state can, and does, supply and which means real progress even though it be far from the ideal we hope to attain eventually.

Organized forest work began in Maryland in 1906 through the activities

of a few people, who succeeded in securing the necessary legislation to establish it, and did not come because there was a demand for it on the part of the people at large. It started in an inconspicuous way, with a small appropriation, too small in fact to attract the notice of the politicians. Like many other states the promoters of the forest movement in Maryland had the co-operation of the United States Forest Service which offered a model law, that, with a number of modifications to suit the circumstances, was adopted. One of the good features of the law was the provision relating to a non-partisan State Board of Forestry, consisting of the Governor, the Comptroller, the president of the Johns Hopkins University, the president of the State Agricultural College and two appointees of the Governor, one of whom shall be a citizen of the State interested in the advancement of forestry and the other a practical lumberman, engaged in the manufacture of lumber within the state. Notwithstanding the fact that Maryland has the reputation of great political activity within her state boards, the Board of Forestry has been entirely free from it, and ever since the work was organized there has been absolutely no political interference and it is not believed that with an ex-officio board of this character, such a thing is probable. The forest law has been amended in two or three particulars, but in the main it stands to-day as representing nearly everything that is needed from the standpoint of legislation, and its successful working has prompted other states to adopt many of its provisions. Forestry in Maryland has a promising field and while progress has been slow, a substantial foundation has been laid which will enable the state to proceed in the development of a forest policy along constructive lines. The first appropriation was \$7,000 for the two years 1907-1908; \$8,000 for the two following years; \$9,000 for the next two years



GOOD SPECIMENS OF FOREST GROWN WHITE OAKS, KENT COUNTY.

and for the years 1913 and 1914 the sum of \$84,500 becomes available. It should be added that \$58,500 of the last biennial appropriation is for the purchase of lands, leaving \$26,000 for maintenance and publications.

State work is necessarily of an extensive character, rather than intensive. The position of Maryland is perhaps unique in the great variety of natural conditions that exist within her borders. From the extreme southeastern to the extreme northwestern corners of the State is practically 265 miles in a straight line and between these two extremities are found as great a variety of soil conditions, tree species, and forest types, as can probably be found in any state. This gives a diversity of conditions that is not usually found elsewhere. In the extreme southeastern part of the State are pure stands of red gum, cypress and loblolly pine, such as are common to the south; while in the extreme western part, in the mountain region, the white pine, tamarack, hemlock, spruce, yellow birch, sugar maple and other trees of the northern type are found. Between these extremes is a variety of hard-

woods that would be difficult to duplicate in any other equal area in the United States. Likewise this field presents nearly every form and degree of forestry from the worst kind of mismanagement to the most intensive form. In the central part of the State where the best agricultural soils are found, the woodlands are confined, as a rule to relatively small woodlots, receiving in most cases fairly intense forest management under the selection system. In the southeastern part of the State, where pure stands of loblolly pine are found, the form of management approaches the clear cutting system. Southern Maryland is a section in which large areas, that were formerly cultivated, prior to the Civil War, are now grown up in pines and hardwoods. In the mountain forests of the western section, destructive methods of lumbering and severe forest fires afford excellent examples of what to avoid in the practice of forestry. There are two million acres of woodland in the State, which represents 35% of the total land area, so that according to the ideal arrangement in an agricultural state, the per



A HEAVY SECOND GROWTH STAND OF LOBLOLLY PINE, SUCH AS IS FREQUENTLY SEEN IN THE LOWER EASTERN SHORE PENINSULA OF MARYLAND.

cent of woodland is still in excess of local needs. It is estimated that 20% of the total land area is better adapted to a forest growth than for cultivation or pasture, and it is not likely that the woodland will ever be reduced below this percentage. Probably 95% of the woodlands are in small holdings, ranging from 5 to 1,000 acres, so that it is difficult to get organized co-operation in fire protection, because of the large number of owners involved.

Naturally under the diversity of conditions that have been indicated, the forest problems of even a small State like Maryland are many and varied. What is true of Maryland is also applicable in most of the eastern states.

The main forest problems in Maryland may be classed under: Investigation of forest conditions; Educational work; Co-operation with land-owners; The control of forest fires; Acquisition and care of State Forests.

INVESTIGATION.

Before any State can adopt an intelligent forest policy there is the need of reliable information concerning its

forest resources. This has been secured by the different states in various ways and in a more or less approximate manner. The first work done in Maryland was the beginning of a forest survey, by counties, in which all the woodlands were plotted on base maps, drawn on a scale of 1 mile to the inch. All woodlots of 5 acres or more were located as accurately as possible and classified as to character and condition, as nearly as could be done by a superficial examination in driving over the public, and many of the private, roads. This work has been continued from 1906, until the present time, when the survey of the State has been completed, with the exception of one county. In addition to the forest map of each county, a large amount of information was obtained as to forest fires, suitable methods of forest management, timber production and uses, market conditions, transportation facilities, the forest fire sentiment in the communities, etc. This first-hand information has enabled the Forester to become intimately acquainted with all sections of the State and the various conditions that are presented; the



A DENSE YOUNG STAND OF MIXED HARDWOODS IN NEED OF AN IMPROVEMENT CUTTING.

results of these studies being published in the form of county reports, a number of which will appear during the coming winter as an appropriation of \$6,000 has just been made available for this purpose.

Further investigations are being made as to the rate of growth of the important timber trees and other studies in anticipation of future needs. The idea is to have in the possession of the State such complete information as will enable the forest officials to meet the various questions that are constantly coming up in an intelligent manner, and without delay. Maryland has placed more emphasis upon this feature perhaps than other States, but to us it seems fundamental and I believe will be fully justified.

If forestry is to succeed fully, it must be presented in a popular manner, so that its principles shall become household words, so to speak. To accomplish this necessitates the use of every available means by which it may be introduced to all classes of people. It is primarily a campaign of education that must be conducted for many years to come. It is particularly important in the beginning. The educational feature of the work takes various

forms as for example, lectures before various organizations, miscellaneous gatherings, in fact any places or occasions where an audience is provided. This will naturally take a wide range possibly from a woman's sewing circle to a legislative assembly. The most effective work is done with Farmers Institutes, Farmers Clubs and Granges, because in such meetings there is the direct contact with the progressive woodlot owner. Forestry exhibits at the county fair and other exhibitions is an effective method of reaching many people. Publications bearing on various forestry subjects and calculated to meet specific needs are also an effective means of education. The Maryland law provides for a course of lectures on forestry at the State Agricultural College which as supplementary education along agricultural lines is productive of good results. The plan of keeping the newspapers supplied with material that they will publish is another educational feature and not to be slighted. In all of the educational work, the important thing is to reach the individual landowner who has it in his own hands to promote or hinder the real progress of forestry and to do this is one of the most difficult



A PASTURED WOODLOT SHOWING POOR SOIL COVER AND ABSENCE OF YOUNG GROWTH, DUE TO OVER-GRAZING.

problems of State forest work. After all the means enumerated have been used to the limit, people will be found who have never heard that there was a State Forest Organization.

The plan of examining woodlands upon application and giving advice to the owners has been carried on in Maryland, as in other States. Since the adoption of this plan about 28,000 acres of woodland have been examined and advice given as to its management. These areas are widely scattered over the State and each serves in a way as an object lesson of practical forestry applied in a manner to meet the needs of the individual case. This work has been supplemented by the establishment of five demonstration forests in as many different counties for the purpose of carrying out in a more definite way certain plans of forest management. These demonstration forests belong to private landowners who have agreed to manage them under the direction of the State Forester. In this way the State can offer demonstrations of applied forestry without having to acquire the land and so far the plan has worked very satisfactorily.

One of the easiest ways to interest the average landowner in forestry is to

get him started along the lines of tree planting. Trees grown in a State Forest nursery and sold to him at cost is an inducement. The demand for such stock is usually much greater than the supply. In this way a man may be perfectly willing to plant trees on good agricultural land, when under the most favorable conditions no profit can be reasonably expected, while he may have a hundred acres of burned over mismanaged woodland, which if protected properly and managed would increase the yield to three or four times what he now receives. As a purely business proposition much of the private planting that is done is open to serious question, but inasmuch as the landowner insists upon doing it and it really advances the interest in forestry the State is not without justification in encouraging the enterprise. At any rate forest planting in the east, or elsewhere, under certain conditions is a good thing and if we as foresters encourage the would-be planter to restrict his planting to locations where fire protection can be assured and to soils not suitable for more remunerative crops, and to trees of rapid growth and early maturity, no permanent harm will be done to the individual or to the reputation of the forester.



A ROADWAY THROUGH A MARYLAND FOREST.

The control of forest fires is the most important problem in Maryland, as is apparently the case in all of the other States. It is reasonably certain that if forest fires in the mountains could be controlled within reasonable limits, the timber production of that section would be at least doubled. Without such fire control conservative forest management is out of the question.

There are some sections in the State where forest fires are infrequent, such as the southern portion. In other places, such as the central part where the forest lands are generally isolated woodlots, fires are frequent but never so destructive because they are usually confined to relatively small areas. The annual loss from forest fires is about \$100,000, the bulk of which is in the three western mountain counties. The forest laws are adequate to deal with the forest fire situation and now that we have secured increased appropriations for the purpose, it is believed that a fairly effective system may be established. The system now in operation is that of local forest wardens, forest patrolmen and lookout watchmen. All of these men are commissioned as forest wardens by the Governor, upon recommendation of the State Forester. The law limits the number of wardens

in each county to one for each 15,000 acres of woodland or majority fraction thereof. The wardens are under the control of the State Forester and are paid for services rendered at the rate of 25c. per hour, the county and State sharing equally in the expense. The wardens have the authority to employ assistance, arrest without warrant, the power to summon help in case of emergency, and in fact, they are given full authority to deal with forest fires and the enforcement of all forest laws. The forest patrolmen are employed under the co-operative arrangement provided in the Weeks Law, the State putting up \$1,200, which amount has been duplicated by the Federal Government to pay the expenses of the patrol work. This amount will be more than doubled for the next year.

STATE FOREST RESERVATIONS.

As a general policy the acquisition by the State of large forest areas is open to question. To my mind there are but three legitimate objects to be considered in such purchases.

1. Mountain lands, which have a high value for water conservation in state streams, in addition to timber production and upon which the present or

prospective owners cannot afford to practice conservative forest management because of economic conditions.

2. Small areas distributed over the state to serve as demonstrations of practical forest management.

3. Lands of special value for State parks, or watershed protection.

Maryland owns less than 2,000 acres of State Forests located in the mountain section and which may be classed under number 1 above. These came to us by gift at the time the first forest law was enacted. The five demonstration forests under State supervision, but privately owned, served as the second class of State Forests; while the third will be represented in the Patapsco Park, near Baltimore, for the pur-

chase of which \$50,000 has recently been appropriated by the State.

These are only a few of the more important problems with which the State has to deal. Many others are awaiting solution, such as the taxation of woodlands, the problem of forest tree insects, and diseases, the encouragement of wood-using industries that will utilize low grade material and make forest management more profitable, the protection of shade and roadside trees, and new ones constantly asserting themselves as new conditions are presented.

*Photographs by courtesy of the Maryland State Board of Forestry.

AMERICAN FORESTRY ASSOCIATION DIRECTORS MEETING

THE midsummer meeting of the directors of the American Forestry Association will be held in the White Mountains, in connection with a trip on July 17, 18 and 19, arranged by a joint invitation extended to them and their guests by Governor Bass, of New Hampshire, the president of the American Forestry Association; the New Hampshire Forestry Commission and the Society for the Protection of New Hampshire Forests.

The following itinerary has been arranged for all those starting from New York, but it is desired that if it is more convenient for others to join the party at some point en route that they may feel free to do so. If sufficient acceptances to the invitations are received a special Pullman car will be attached to the regular 8 p. m. train for Concord, N. H., at the Grand Central Station, New York, on Tuesday evening, July 16, which will be sidetracked at Concord on Wednesday morning.

The party will breakfast Wednesday, July 17, at the Eagle Hotel and Governor Bass will then receive and welcome the party at the State Capitol. Automobiles will be furnished through the courtesy of a number of those in attendance and an automobile truck to carry all baggage. A run will then be

made of about seventy-five miles to Deer Park Hotel at North Woodstock stopping on the way to see the State Nursery at Boscowan and to lunch at Plymouth. At Deer Park Hotel the party will join members of the Society for the Protection of New Hampshire Forests in a short visit to the most beautiful Lost River Reserve nearby, lately purchased by the Society, returning to the Hotel for dinner and the night. The morning of Thursday, July 18, the party will proceed by automobile through the profile notch to the Mt. Washington Hotel, Bretton Woods, for lunch and remain there in attendance upon the fifth annual forestry conference which is to be held at Bretton Woods on the 18th and 19th under the auspices of the Society for the Protection of New Hampshire Forests in co-operation with the State Forestry Commission and the Association of North Eastern Foresters. Short excursions from this point can easily be taken to see the New State Reservation of Crawford Notch and the proposed Federal Reserves to be purchased under the Weeks Act. The special Pullman will be brought from Concord to Bretton Woods for those returning to New York and leave at about 8:30 a. m., July 20, and arrive in New York at about 9 p. m.

THE NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY

ON July 15, 1911, the act establishing the New York State College of Forestry at Syracuse University became a law through the signature of Governor Egan. The objects and purposes of the College as stated in its organic law are:

"The studies upon land acquired for such purposes of such experiments in Forestry and Reclamation as the Board of Trustees deem most advantageous to the interests of the State and the advancement of the Science of Forestry."

"The planning, raising, tanning and selling of trees and lumber of such kinds of such species and quantities as the Board of Trustees deem best with a view of obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration and the production, harvesting and transportation of wood crops and the securing of a revenue therefrom."

The College is directed under the control of a Board of Trustees, partly designated by the act of organization, partly appointed by the Governor and partly elected by the Trustees of Syracuse University.

New York was one of the first States to realize the necessity of training young men as foresters. In 1888 the State Legislature established a State College of Forestry at Cornell University and gave to the College a tract of 10,000 acres in the Adirondacks to be used as a demonstration forest. Owing to an unfortunate combination of circumstances arising in the management of the demonstration forest at Bantam the College was closed in 1904 after four very successful years under Dr. H. H. Henshaw, now Dean of the Faculty of Forestry at Cornell University. In view of the tremendous interest in every phase of forestry in the State evidenced by a constant demand from all classes of people for more information as to the reforestation of waste lands and the

best methods of caring for what we still have, the State College of Forestry was reestablished and located at Syracuse University because of the easy accessibility from all parts of the State, nearness to the Adirondacks, and because of splendid facilities offered students in forestry far more in other colleges of the university in engineering and the natural sciences.

Those who framed the organic law of the College saw clearly that such an institution should serve the State in more than instructional work in forestry only and obligated the College to carry on two definite and equally important lines of work. The carrying on of such research and investigative work in forestry as well as in the solution of the many problems which confront the people and the State of New York in the protection, care and reforestation of their increasing valuable asset of the State—the forests of the Adirondacks and the Catskills, and in the gradual reforestation of the millions of acres of waste lands in the State which are allowed to a forest into ruin. Second, the giving of instruction in forestry, not only to students who may be attending the professional courses in the College or the practical ranger course, but to anyone else in the State who wishes to know more as to the care of their trees, the planning of waste lands so that such lands may become a profit and not a loss, the raising of timber so that another crop may be obtained, the treatment of timber so as to prevent decay and general facts as to our trees and forests and the animals and plants which may help conserve them.

A FOREST A FOREMAN'S SON

To be able to carry on effectively such research and investigative work as well as to formulate help in the State, the Legislature stated in its act that \$2,500 of the annual appropriation for the College of Forestry should be used

for the purchase of land. Early in April a tract of 90 acres, made up of two small farms and their buildings, and lying just beyond the south boundary of the city on one of the main trolley lines, was purchased and is known as "The Forest Experiment Station of the New York State College of Forestry." The land was selected because of accessibility from the city and the University; because of great diversity of soil conditions and because of a living stream of water which can be made easily available over the entire tract. Some 30 acres is covered with woodlot made up largely of maple, oak, hickory and other hardwoods, but containing an unusual amount of volunteer seedling growth of pine, hemlock and arbutus. During the present spring over 450,000 seedlings of conifers will be put into transplant beds for use in experimental work in reforestation of waste lands. A hundred seed beds will be planted with seed of a large number of species, but mostly of conifers. Several lines of experimental work are being organized, some of which will be carried on in co-operation with the State Conservation Commission, the Department of Forestry of the State College of Agriculture at Cornell and with other forest interests of the State.

PROFESSIONAL TRAINING IN FORESTRY

A four-year technical course leading to a degree of Bachelor of Science in Forestry will be given. Upon completion of a fifth year in the College and a period of satisfactory practice, the graduates of this College will be granted the degree of Master of Forestry. For graduates of Syracuse University or other institutions of similar rank, whose undergraduate work has not had special reference to technical forestry, two years of work in the College will be required for the Master's degree.

THE RANGER SCHOOL

The increasing demand for men trained in the woods and understanding the elementary principles of Forestry has led the college to establish a ranger

school to be known as the "New York State Ranger School." An intensely practical course of two years will be given, which it is believed will prepare men in a splendid way for work as forest rangers, forest guards, forest estate managers, nursery foremen and tree planting experts. Two thousand acres lying along Cranberry Lake in the Adirondacks has been offered to the College for its Ranger School and it is planned to give nearly all the work of the School in the woods. During a portion of each year, instructors will be at the School to give work in Mathematics and Engineering, Botany, Soils and Geology, Zoology and Entomology and related lines. Practical woodsmen and lumbermen will be brought in for special instruction. It will be the constant aim of the College to turn out men from the Ranger School who will understand the forests and their care and what they mean to the State, and who will be as practical in the woods as training of such length can make them.

WHERE THE COLLEGE WILL WORK.

For the present, the State College of Forestry is located in the new Natural Science Building of the University, Lyman Hall. Laboratories are being equipped for work in Dendrology and Wood Technology. The Forest Experiment Station will be used for instructional work in Seeding and Planting and Nursery Practice. Some \$8,000 of the present year's State appropriation for the College will be spent during the coming summer for a range of greenhouses and potting and seed storage rooms for winter work in Nursery Practice and for experimental work in Silviculture, Forest Pathology and Entomology. A Forestry library for the College has been begun and an effort will be made to make this library unusually complete and accessible, that it may become especially valuable to those wishing to do research work along any phase of Forestry. A very large room has been assigned the College for a Forestry Museum. Collections will be made to show economic relations and



Photo by Hugh P. Baker.

LYMAN HALL OF SCIENCE, THE HOME OF THE NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY. THE COLLEGE HAS AMPLE QUARTERS IN THIS NEW BUILDING.

developments and for their instructional value.

The College, through numerous trolley and steam lines running in every direction from Syracuse, has easy access to a wide territory in which there are unusual examples of different forest floras, forest conditions, and logging and lumbering operations. In its nearness to the Adirondack forest, where the Conservation Commission is doing such splendid work in reforestation, of extensive areas of waste lands where reforestation is greatly needed, and large logging and manufacturing operations, there is no more strategic center anywhere in respect to the solving of forestry problems, than that of the New York State College of Forestry.

THE TEACHING STAFF OF THE COLLEGE

That the preliminary work of organization might be begun at once and that

arrangements might be made for instructional work during 1911-12, the Board of Trustees appointed Dr. William L. Bray, Chief of the Department of Botany in the University, as Acting Dean of the College. Dr. Bray has not only had an unusually strong training in Botany, but for several years carried on investigational work in Western Texas in co-operation with the United States Forest Service, which resulted in the publication of valuable reports on forest conditions in our Southwest.

In February, 1912, Dr. Hugh P. Baker was elected to the position of Dean of the College of Forestry, and he entered upon the work on the first of April. Dr. Baker has a Bachelor's Degree from the Michigan Agricultural College, a degree of Master of Forestry from the Yale Forest School and in 1910, after a residence of one and one-half years in Germany, received the degree of Doctor of Economics from



Photo by Hugh P. Baker.

THE VALLEY FARM OF THE FOREST EXPERIMENT STATION OF THE NEW YORK STATE COLLEGE OF FORESTRY. OVER 150,000 SEEDLINGS WILL BE PUT INTO TRANSPLANT BEDS ON THIS AREA AND 100 SEED BEDS PLANTED WITH SEED FOR BOTH CONIFERS AND HARDWOODS.

the University of Munich. He entered the then Division of Forestry in 1901, and for ten years was continuously connected with scientific and practical work in the Government Service. In 1904 he took charge of Forestry at the Iowa State College, developing the work there, and in 1907 took charge of the Department of Forestry at the Pennsylvania State College.

In the fall of 1911, to meet immediate need for instructional work in Forestry, Mr. E. E. McCarthy, a graduate of the Forest School at Ann Arbor, came to the College as Assistant Professor of Forestry, and during the past year has been giving courses in Dendrology, Mensuration and Silviculture. He remains at the College under the newer organization and will have charge of the work in Dendrology and Wood Technology.

Mr. John W. Stephen, who was graduated from the Forest School of the University of Michigan and who

spent two years in charge of State Forest Lands in Northern Michigan, came to the State Conservation Commission in 1908, as a Forester and developed the extensive State Nursery at Salamanca. He took up work with the College on April 15th, as Assistant Professor of Silviculture, and will have direct charge of the Forest Nursery being developed at the Forest Experiment Station, and will develop during the coming spring a demonstration planting on the State Fair Grounds. He will have charge also of such extension work as the College does in reforestation of waste lands in the State.

Professor Frank F. Moon, who has been in charge of the work in Forestry at the Massachusetts Agricultural College for the past two years, and who will spend the coming summer in Germany, comes to the College in September as Professor of Forest Engineering. He will have charge of the work in Forest Mensuration and Engineering,



CUTTING DOWN CHESTNUT TREES AT SOUND BEACH.

and will carry on work in Forest Mapping in co-operation with the State Conservation Commission.

Professor Nelson C. Brown, who is now connected with the Department of Horticulture and Forestry at the Iowa State College, and who was formerly Deputy Forest Supervisor of the Deerledge National Forest in Montana, comes to the College on the first of July as Assistant Professor of Lumbering.

Professor Brown, who is a graduate of Yale College and the Yale Forest School, has had very unusual practical training in Forestry, and will have entire charge of the courses in Lumbering, Forest Utilization and related lines. During the coming summer he will make a study of logging and manufacturing operations in Northern New York, to gather material for his work in the College and for publication.

THE CHESTNUT TREES GOING

EVERY student and lover of human nature has mourned on account of the sickness and death of the chestnut trees, says *The Guide to Nature*. The chestnut trees are our special friends of the forest and around them are particularly pleasant memories of the time, when in our youth, we gathered their fruit. In their flowering and fruiting they are of great interest in later biological studies. A more graceful shade tree never existed. They have been tried and found true from our childhood to our old age. They have been valuable in our poetry, our pathos and our commerce. But even the most skilled scientists have not been able to cope with the ravages of the terrible fungus disease which

attacks the trees after the fungi hide themselves under the bark. The sooner such trees are cut down the better, for with no host tree on which to feed and propagate, perhaps the chestnut disease will die out, and we may hope that our grandchildren will gather nuts and tell their grandchildren of their nutting excursions, and of the squirrels with which they shared their spoils.

In South Beach, Conn., not far from our Arcadia, is a grove as primitive as when Keofferman, or Mianus, or Cos Cob, led his warriors to battle. To this grove, commonly known as the Miller woods, have come the lovers, the saunterers, the picnic parties, the botanists and the ornithologists, and to it have come, as to an entomological



DRAWING THE CHESTNUT LOGS TO THE SAWMILL.



STEAM SAWMILL CUTTING UP THE CHESTNUT LOGS.



DRAWING THE LUMBER OUT OF THE WOODS.

Mecca, the expert collecting entomologists from the American Museum of



SOON THE CHESTNUT BLOOM WILL BE RARER THAN THE RAREST ORCHIDS.

Natural History of New York City. The grove is rich in everything that is good from an inspirational and educational aspect, and everyone who has known these beautiful woods will regret the loss of the stately chestnut trees that only a few years ago were so thrifty.

But the owner is doing the right thing. He is removing them as speedily and as skillfully as possible. This is being done under the management of Contractor Hawks, with his sub contractor Bailey, of the portable sawmill. While the saw mill has been in action hundreds of visitors have been attracted to the place because here logging has been carried on in as picturesque and as skilled a manner as it is in the primitive forests of northern New England. One can hardly realize in looking at the accompanying illustrations that these scenes are only a short distance from modern residences, a railroad and a trolley car track.

Photographs by courtesy of *The Guide to Nature*.

TO FIGHT FOREST FIRES.

Twenty-five miles of telephone lines have been constructed this spring by the Coeur d'Alene Timber Protective Association, and an additional 25 miles will be constructed before the fire danger season is at its height.

LUMBERING AND FORESTRY

WORK OF THE INTERNATIONAL PAPER COMPANY AND CHAMPLAIN REALTY COMPANY IN FORESTRY IN CONNECTION WITH THEIR LUMBERING OPERATIONS IN NEW HAMPSHIRE AND VERMONT *

BY GEORGE A. CHEDEL, *Superintendent*

THE acreage of timberlands owned by the International Paper Company and its subsidiary Company, the Champlain Realty Company, in New Hampshire and Vermont States is 147,085 acres of which 79,723 acres are in Vermont and 67,362 acres in New Hampshire.

The average consumption of spruce wood in the mills of the International Paper Company in this division, under normal conditions, is 45,000 cords per year. During the thirteen years which the International Paper Company has been cutting, or since its formation, there has been cut on the lands in this division approximately 312,000 cords, or an average of about 24,000 cords per year, or less than two-tenths of a cord

per acre per year—this is probably about equal to the natural growth. The balance of the supply, or 21,000 cords, per year has been purchased mostly outside of these two States. Following out their policy of conserving their own supply the cuttings by the Company for the past two years have been only 32,339 cords and the purchases 54,783 cords, a total of 87,122 cords.

Before the Company was formed little or no attention had been given to the conservation of timberlands in the lumbering operations in that vicinity. A great increase in the stumpage value of lumber, however, caused the Company to look forward with greater care to their future supply for the different mills in this division. With the in-



GROWTH OF SMALL SPRUCE AFTER LARGE TREES HAVE BEEN CUT FOR PULP WOOD.



LUMBER OPERATIONS INTERRUPTED BY FIRE AND GOOD TIMBER DESTROYED.



PULP WOOD CUT ON TRACT OF THE INTERNATIONAL PAPER COMPANY.

creased value of lumber of course the value of pulpwood also increased. Of their holdings in Vermont and New Hampshire the greater portion were lands which had been only partially logged and in many cases there had been no cuttings, in fact nine-tenths of their holdings when the International Paper Company was formed was a virgin growth. At that time in operating these lands no great care was taken to preserve the smaller growth and much timber was cut and left to waste that would now be used for pulpwood.

As an example of the difference in methods in the early days of the Company's operations and those in use at the present time I may quote the wording of contracts. Formerly when a lot of spruce was to be cut the wording of the contract would be that "the party of the first part agrees to go onto said lot and cut all the spruce timber and deliver it on the river bank." Now the contract for this same operation would read—"The party of the first part agrees to cut and deliver on the river bank all the spruce, down to twelve inches in diameter, two feet from the ground, except in solid growth on the sides of the mountain where the timber is to be cut clean. Said party of the

first part agrees that the work shall be done in a workmanlike manner, that he will cut only such trees as are marked for cutting or such as he may be directed to cut by an agent of said party of the second part (the Company); that all trees shall be sawed down close to the ground, that no spruce shall be used for corduroy roads or bridges or for skids or levers and that he will use all reasonable means to prevent the injury or destruction of small spruce trees and that all spruce timber cut, down to five inches at the top end, shall be removed from the land and delivered on the river bank."

Eight years ago the Company practically stopped cutting in Vermont, confining their logging operations in this vicinity almost entirely to New Hampshire. Since that time until the present year there has been no operating in Vermont, except a few small operations in four foot wood, on lands purchased in recent years. Their logging operations in New Hampshire were confined to the towns of Easton, Landaff, Benton, Woodstock, Lincoln, Orford and Lyme.

Logging operations have been confined for five years to the towns of Woodstock, Benton, Landaff, Lincoln

and Easton, N. H., the supply taken from those lands being driven down the Connecticut river to the mills in Bel-lows Falls. The entire cutting of timber for the past five years on these lands has been on very steep mountain slopes where the spruce was almost entirely of solid growth. On these slopes where it has been possible small patches of timber have been left with the idea of reproducing on the slopes from the seed from the small clumps of trees which have been left. We find this to be very practical as on cuttings of ten years ago, where there have been no fires, under similar conditions there is now a vigorous growth of young spruce coming in with the hardwood and bird cherry which usually follow where the timber has nearly all been cut off.

In these towns there were 21,346 acres which have all been logged over except about 2,500 acres, located around and near the top of Mount Moosilauke, which have been left, partly because it was expensive to log and partly as it

was thought best to leave it at this time with the idea that if it could be protected from fire it would aid in the reproduction of timber on the lower slope of the mountain by reseeding, where the timber has been cut very clean down to the hardwood growth.

On these lands where there has been a mixed growth of spruce and hardwood the spruce has been left to about an eight inch diameter, for future growth. The timber in this section was cut much smaller than the Company intends to cut on their lands hereafter as it was likely that it would not be profitable to log these lands again in the next sixty years.

In transferring their lumbering operations from New Hampshire to Vermont this season they are now cutting to a twelve inch diameter limit, two feet from the ground, in mixed growth. This is not a hard and fixed rule, however, much being left to the discretion of the Forester who has charge of marking the timber before it is cut. By



FIGHTING FIRE FROM BACK FIRE LINE.

having the timber marked by men who are well versed in forestry, the Company hope to preserve the young growth to better advantage than by leaving the selection of trees which are to be cut to the men who are doing the work. On the slopes where there is a solid growth of spruce the timber is cut clean, the trees themselves being trimmed and utilized down to four and five inches at the top end. When land is cut in this way if there is no source of natural reseeding by standing timber which will distribute the seed nor any small growth coming in, it will be planted in one or two years after logging operations are over with nursery stock grown at the Company's own nurseries.

The Company had never before had any marking done for the workmen in cutting timber, but this system is being practiced this year on all the logging operations of the International Paper Company. We expect that this will result in a great saving of the young growth and also in cutting the timber closer to the ground and into the tops as the same men who do the marking go over the cuttings from time to time and in addition to this they have a fore-

man who goes over the cuttings and who also looks after these details and in this way the Company expects practically to eliminate any waste. This system of cutting is applied entirely to timberlands on which there is a mixed growth of spruce and hardwood and on which there has been very little or no logging. On lands which have once been cleared and have come into spruce, which is called second growth or field spruce, the only system which is practical is to cut the timber into four foot wood, then let the timber grow until it is large enough for pulpwood and cut again clean. There are often on these tracts of land where four foot wood is cut, of the field variety of spruce, a sufficient number of seed trees, which are called bull spruce, and which we never cut, as they are rough and knotty and unfit for pulpwood. These trees will again seed the land into spruce, under favorable conditions, but when this is not possible it must be replanted to again get back into growing spruce.

The purchases of timberland in recent years by the Champlain Realty Company have nearly all been of the second growth or field spruce timber, as



YOUNG GROWTH ON A HILLSIDE.

owing to the high price of timberlands at the present time the Company finds that to buy lands on which there has never been any timber cut is unprofitable as there can be no increase of growth on lands on which there has never been any cutting. Lands which have been once cleared and used for agricultural purposes and have been abandoned and allowed to grow again into timber are found to be more profitable to hold for growth as the growth on such lands is often very rapid and sufficient, at a reasonable purchase price, to cover the interest on the purchase price and moderate taxes.

It is the Company's intention, in this division, to at least plant a tree for every one cut on their lands and as many more as they may be able to plant

conveniently and profitably. I know of no Company in the lumber business in Vermont or New Hampshire which at this time is doing as much to conserve and reproduce their lumber supply as the International Paper Company. To my knowledge none of the other lumber companies in these two States are conducting a nursery or doing any considerable planting on waste or cut-over lands. If all the lumber operations in Vermont and New Hampshire were to be conducted as conservatively as the operations of the International Paper Company the next quarter of a century would see a large increase in the amount of growing timber in both States.

*Paper presented at a meeting of the Vermont Forestry Association.

A WOMAN TREE CHOPPER.

D. Woodbury Bachelder of Manchester, N. H., engaged in the lumber business at Damariscotta, Me., has in his employ a most remarkable woman as regards strength and endurance. She is Mary Gregory, wife of Frank Gregory.

She first entered the employ of Mr. Bachelder to provide meals for the fourteen men in the camp. This she was able to do and have half a day left in which to engage in the work of the men, and asked permission of Mr. Bachelder to take her place with the choppers.

Mr. Bachelder gave his consent and was astonished to see her perform. She wielded an axe as expertly as any man in the crew and made a record one day of chopping, splitting and piling three cords of wood, a task that most men, hardened to the service of the woods, are incapable of equalling. Mr. Bachelder says:

"She is the strongest woman I ever saw. No sooner does she fell a tree than she is on top of it, limbing it out, and in every line of work she is the equal of the men in camp. She handles a crosscut saw with all the skill of a man and not a laborer in the camp can surpass her in the amount of work accomplished."

HISTORIC WASHINGTON TREE.

A historic old tree, believed to be 500 years old, famous also because it was used during the Civil War as a signal station, and by Confederate sharpshooters, when Gen. Early, in 1864, made his attack upon the national capital, has been recently cut down.

The tree was in perfect condition until struck by lightning recently. It stood about three miles north of the Capitol. Some Confederate soldiers killed during the two days' fighting, July 11 and 12, 1864, near the capital, were buried under it.



SPLENDID SPECIMEN OF NATIVE BURR OAK, IN OAKLYN PARK, AT LAKE CITY,
MINN.

From the Minnesota Horticulturist.

THE PROBLEM OF OUR LOGGED OFF LANDS

BY J. J. DONOVAN

THE nation-wide interest in conservation of our resources has caused special attention to be given the great areas of stump land lying idle in every lumber producing State.

Lumbermen have been condemned unheard or unheeded as destroyers of a great resource and putting nothing in its place, by well-meaning men and women who have only superficially examined the situation or view it from the standpoint of the muckraker and sensationalist.

The land owner, after the trees are cut, has had to face archaic tax conditions, poor soil or heavy drainage or stump removing expense so that unless he had large capital and was willing to wait long for returns it was impossible to utilize the land. Choice spots near the cities and along the rivers have been cleared up, usually by industrious men of foreign birth who were not hunting a short cut to wealth, but many of whom now have fine farms and comfortable homes as a result of their struggles with the stumps. This method of reclamation has been slow and unnecessarily wasteful of labor and time.

Dynamite, donkey engines, gasoline and electric blowers, car pitting and, for all stumps save those of the Pacific Coast, horse machines greatly reduce cost when intelligently used.

When all excuses are made, the fact remains that there are many millions of acres of this cut over land lying absolutely useless in the United States today in spite of the land hunger that fills the waiting lines for weeks prior to any offering of land by the government and sends one hundred thousand American citizens each year to the Canadian Northwest. What is the matter? Some answer, "high taxes"; others, "poor soil"; others, "expensive labor, lack of markets, need of drainage," and so the story goes. There is

some truth in all these claims but there is room for millions of people on these lands and certainty of good returns if there is intelligent co-operation and direction.

I am fairly familiar with conditions in the northern half of the United States, and realize fully that the lumbermen are not wholly blameless but the legal and economic conditions are such in most cases that they have had little choice. The same men who demand that for every tree cut one be planted, object to changes in systems of taxation which make it possible to reforest with any chance of profit. Therefore much land reverts for non-payment of taxes to counties which continue the do-nothing policy of the original owner. When the States are owners and have sold the timber, they generally make no use of the logged-off land until some settler finds a choice piece of agricultural land which is then sold.

Whether the owner is the State or a private company or individual, we need a revision of our laws and awakening of interest so that land will be used:

First. Agriculturally wherever soil is suitable that our citizens seeking homes may remain under our own flag.

Second. For grazing if conditions do not warrant removing stumps and bringing under the plow.

Third. For reforesting such tracts as are not available for better uses.

How shall this be accomplished? For bringing stump land under the plow some advocate assistance from the State analogous to that given in reclaiming desert lands by irrigation, or by improvement districts similar to those under which swamp-lands have been reclaimed. Minnesota has a law of this character. In Washington many good men advocate State aid on one of the above plans. I doubt the wisdom of this policy and believe private enterprise can solve the problem

in every case where the real value of the land warrants the expense. Large holdings can be improved at less expense per acre than small ones and for this reason, if the logging companies themselves do not clear up the land, holding companies devoted to clearing and selling are necessary and such a plan is just being made effective in southwestern Washington. The Company which I represent, the Lake Whatcom Logging Company of Bellingham, Washington, has placed fifty-two individual settlers or families on logged off lands during the past five years and not one has thrown up his contract. Most have paid up in full, are prosperous and contented. Our theory is to sell in small tracts to actual settlers at reasonable prices on easy terms and to help with lumber and clearing where moderate payment is made. We do not offer land until we have opened roads and secured fair mail and school facilities.

Wherever the soil is good and companies secure a good class of settlers, this plan will solve the problem. The second class lands suitable for grazing or too remote from centers of population to warrant expense of removing stumps can be made of value by burning over in the spring or fall and following up with a moderate sowing of timothy and clover as soon as the ashes cool. Anyone interested in this phase of development should obtain the U. S. Department of Agriculture's Farm Bulletin 462, "The Utilization of Logged-off Land for Pastures in Western Oregon and Western Washington," by Byron Hunter and Harry Thompson, who have investigated the question at length and have deduced many valuable conclusions. The bulletins of the L. O. L. Association of the State of Washington contain much information of value. Its President is Mr. J. W. Brown, Alaska Building,

Seattle, Wash., from whom these bulletins may be obtained. This organization, formed in 1908, secured co-operation of the State of Washington and of the agricultural department of the United States, and much reliable information has been compiled as to clearing costs and methods.

Reforestation cut-over lands scientifically has made little progress on the Pacific Coast even inside the United States Reserves, the area treated being a very small percentage of the whole. The States and private individuals have done practically nothing as yet because there was neither economic reasons nor public sentiment requiring it. This condition is changing and most of the States now have forestry departments whose importance is being realized and supported by the legislatures.

Existing tax laws make impossible reforestation by private owners except in isolated cases. Land suitable for such purposes should be acquired by the State at a maximum price of say five dollars per acre and modern practical forestry methods applied which will transform a waste into a source of lumber supply and revenue to the State fifty years hence. Each State should classify its cut-over lands under one of the three heads given and sell the two first named classes. The balance should be reforested. When these suggestions are applied to the idle tangle of brush and stumps covering many millions of acres in the North and West, conditions will no longer reproach the lumbermen nor the people of the State affected. There are homes for millions under far more favorable conditions than govern life on the cold northern plains but co-operation and intelligence are needed to make these lands available.

*Address at convention of National Lumber Manufacturers Association.

CITY FORESTER NAMED.

Park Supt. Charles G. Carpenter has been appointed city forester of Milwaukee, Wis., by the park board, in conformity with a law of the legislature of 1911. Mr. Carpenter will serve without salary, it being necessary to appoint a forester prior to June 20. Only \$1,200 is available for salary of the forester, and the board decided that the city forest activities for this year would be limited.

PINCHOT TO THE BOY SCOUTS

GIFFORD PINCHOT, Chief Scout Forester of the Boy Scouts of America, has prepared for the Boy Scouts a statement showing how they may learn the age of a tree; how they may estimate the size of the tree ten, twenty or thirty years ago, and especially how to gain practical and valuable information in their trips through the woods.

In this statement Pinchot appeals to the Boy Scouts to co-operate with the foresters, saying that it is a duty which the boys owe to their country. "It is as important," he writes, "that you should study these things as that the foresters should do so. The foresters, being trained men, will know how to make the best practical use of what they learn. But it is upon all of us that the responsibility will fall of carrying out what the foresters recommend; and anything you can do to get an idea of what forestry means in practice, is going to help you to co-operate with the foresters. That will help the woods, and help your country.

"If you can get into the woods where cutting is going on, even if it is only of small stuff for firewood, I suggest that you do this: Count the rings of growth on the stump of a tree, first making sure what kind of tree it is. Count the rings from the center outwards. Each ring means a year in the life of the tree, and the whole number of rings means the age of the tree. Then measure the thickness of the tree across the stump. If the tree has not yet been worked up into logs or into firewood, you can easily measure its height by running a tape line, or a piece of string, from the butt of the first log to the top of the crown, adding the height of the stump. If you make several of these 'stem analyses' on trees of different sizes and then compare the results, you will find out many interesting things about how that

kind of tree grows; for example, that it may grow fastest in height when it is young, fastest in diameter when it is older, and that later on in life diameter growth falls off and height growth is very, very slow.

"But even a stem analysis of one tree teaches you a great deal. It tells you, not only how old was the tree when it reached the size at which it was cut, but also how old the tree was at all sizes since it was a little seedling, for every tree has its own life history written on its ring of growth. Suppose you have measured an oak and found it to be fourteen inches thick and seventy years old. All you need to do to find out how thick that oak was when it was, say, thirty years old, is to measure out from the center the distance covered by the first thirty rings, multiply that distance by two and add an inch for the bark. That tells you very closely how big the tree was forty years ago, long before you were born.

"While you are making the stem analysis, don't fail to study the woods in which the cutting is going on. How do they look? Will they grow trees again like those that have been cut or has the forest been destroyed by cutting? Is the brush piled so that it can be burned up, or are the big tops lopped so that they will rot quickly, or is all this trash strewn over the ground, where it would burn fiercely, and kill what trees are left standing? Have too many trees been cut, so that instead of a forest there are only a few scattered, scrubby trees left, or are there enough to shed seed to plant the land to forest again? Have the trees been felled skillfully? Are the stumps cut close to the ground so as to waste no timber, or have they been cut high up in lazy-man's fashion? Have the logs all been taken out, or just the best ones, leaving a lot of wood lying on the ground?"

TAXATION OF FOREST PROPERTY IN NEW HAMPSHIRE

By J. H. FOSTER

Professor of Forestry, New Hampshire State College

WANY people know that it is unwise for assessors to place high valuations upon forest property, since such action encourages a rapid cutting of timber; few people, however, realize how grossly unjust the system of general property tax on growing forests may become if the assessed valuations are high.

The general tax law calls for the assessment of property at the actual sale value. In the past this law has seldom been enforced and its evil possibilities have been thus far avoided. The fact that assessors have generally been lenient in their appraisal of forest property has made the evil in the law seem less great and has deferred the issue up to the present time. This does not mean that the working out of the tax law has been satisfactory. It has been most unsystematic, unequal and unbusinesslike. Assessments on timber tracts have been ridiculously unequal as regards lots in the same town or in different towns. Many valuable woodlots attached to farms have escaped taxation altogether. Assessors are often unfamiliar with the values of forest property and have not taken the trouble to examine them. Too often they assess from hearsay or place a value only when the property has changed hands and then frequently only once before the timber has been cut off. Sometimes they are prejudiced in their appraisals and non-residents are more often the victims. The writer investigated the condition of forest taxation in New Hampshire in 1908 for the State Forestry Commission and the Federal Forest Service, the results of which were published in the report of the Forestry Commission for 1907-'08. In this investigation over 150

timber tracts and woodlots were examined and studied individually. Many examples of the most surprising inequality were detected but since assessments have been generally low, no great harm resulted.

The New Hampshire Legislature of 1911 created a permanent tax commission, consisting of three members, to have general supervision of all matters pertaining to taxation within the State. This commission within the past few months has in the performance of its duties directed that all property shall be assessed according to law; that is, at its full sale value. By so doing it has brought about a crisis in the matter of forest taxation, as subsequent events are bound to show.

Why is it? Not necessarily because it would be unwise to tax our forests at their full value and thereby lead to their early removal; not because we prize our standing forests and desire to see them remain; not because we need them to protect our slopes and watersheds, and consequently our streams, although these considerations are most important; not by any means because forests should not pay their just proportion of taxes; but entirely and fundamentally because the system of property valuation is wrong in principle and when applied to forests not yet mature would be iniquitous in practice. The consequences of the injustice are brought to a focus only when the assessments approach the actual sale values.

Why is the system wrong in principle? It is wrong because it is on the principle that the man who does not or cannot use up his income, but keeps it reinvested with his principal, is punished by an excessive tax. As

applied to forests, it is especially wrong because the income from the forest is available only at long intervals and instead of being removed each year to be spent and enjoyed or reinvested elsewhere, is stored up on the trunks of the trees and taxed not once but each succeeding year, over and over again, for forty or fifty years longer, until the timber is mature and ready to be cut. There is a fundamental difference between levying an annual tax on property producing an annual income and levying an annual tax on property producing an income only at long intervals. The difference is a matter of compound interest.

It may be illustrated in the case of two lots of land of equal value without any growth. One is planted to forest trees and the other to field crops in such a manner that each lot will produce an annual revenue of \$10. The field crop is harvested annually and the \$10 received each year for sixty years. The forest crop is harvested but once, at the end of sixty years where the accumulated income of \$600 is received. But during all these sixty years the income of \$10 withdrawn each year from the field crops has been accumulating at compound interest until at the end of the sixty years at 5 per cent the total value is not \$600 as is the case with the forest crops, but actually \$3,535.80 or nearly six times as much. If these two lots are assumed to be physically the same and are so taxed then no man would invest his money in forest property.

It is only fair to state at the outset that the burden of unjust taxation has never fallen upon timber property which is now mature. In the past taxes have not often led to premature cutting. The serious problem today rests with the young and partly mature timber and upon the land whose owner wishes to re-forest. It is the most serious obstacle to planting on a large scale by private owners. Timber now mature and ripe for the axe is kept longer on the tax list if the assessments are low, but since the taxes in

the past have been moderate no real injustice is done the owner if the valuation is raised. The mature timber represents a definite value which may be realized at any time. From the point of view of expediency, however, it is still unwise to increase the valuation abruptly. Except in the case of timber mature or nearly so the situation is entirely different. Valuations are now much higher than they used to be. There is little inducement to the private owner to establish forests or preserve his young growth when there is every promise that the taxes and accumulating interest during all the years to come, when the forest is yielding no tangible return, will ultimately consume a very large part of his profit. Who can say that some day after perhaps a third or a half of his future returns have been eaten up in taxes, his still immature forest may not be destroyed by fire? It is not a pleasant prospect for an owner who has spent so much in taxes to thus have his principal wiped out of existence without having had any returns from it whatsoever. There is little inducement to the private owner to plant forests or preserve young growth when he does not know from year to year whether the property will be assessed the same or whether the assessment will be increased 50 per cent or 200 per cent or more. Yet this is the situation that confronts the forest owner.

Old fields reforested now with pine and assessed at \$10 per acre, if allowed to grow for 50 years with a tax rate of 2 per cent and money valued at 5 per cent, will at the end of this period have accrued taxes amounting to at least \$85 per acre. With a net return of \$300 an acre, from the sale of the timber, this means over 28 per cent of the final profits absorbed by taxes. A valuation of \$10 an acre is not excessive under ordinary circumstances and the rate of 2 per cent is lower than the present average in New Hampshire. With a higher valuation and a smaller net return the money spent in taxes might easily reach 50 per cent or 75 per cent. In some cases it might mean confiscation.

These figures do not indicate that growing timber is an uneconomic enterprise. They do indicate that through the influence of taxes assessed annually upon property which does not offer an annual return, the final returns may be largely consumed if the assessments are high. This conclusion is recognized by every economist and beyond reasonable dispute.

It is only because the general property tax on forests has not been more effectively administered that the results up to the present time have not been more serious. It is only because the practice of forestry has not yet become seriously undertaken that our tax system has not been subjected to more hostile criticism. So far we have been busy with exploiting old forests instead of building up new ones. But the present conditions cannot continue. The practice of forestry by private owners must be undertaken and it is safe to say that the practice of forestry cannot be generally introduced under our present system of taxation.

What measures can be advanced for the relief of growing timberlands from the burden of unjust annual taxes? Surely not a relief which means exemption or favoritism. The most earnest advocate of reform in the present system does not wish for this. Exemption, rebate, and bounty laws to encourage reforestation have been passed by a dozen States. There is an exemption law on the statute books of New Hampshire today but it is valueless and ineffective. None of these schemes touch the real problem of taxation. A reform in the method of taxing forest lands must be fair to all and exemptions on this basis are unjustified. It seems probable that any system which would be fair and just to all property could not be applied to forests which have long enjoyed leniency in assessment and have now grown to maturity. In other words the problem is one of vital importance to young forests and those which may be established in the future.

There are only three methods of taxation possible which will establish equality among different land owners.

One is to legalize the assessment of a percentage of the actual sale value of property. If this percentage is fair, the results conform to those which would exist under a more theoretically correct principle. The second is a tax on the expectation value of the forest. This value is equivalent to the returns which will be obtained in the future when the timber is cut discounted to the present time. If the net income from the timber on a given lot 60 years hence could be determined now as \$150 and with money compounded at 5 per cent, the expectation value would be \$8.47. This amount only could in justice be taxed annually for the next sixty years. The objections to this method are vital, and would make it impossible of operation in this country at the present time. Timber values are constantly changing and it would be impossible to anticipate the value at any period in the future.

The third method would provide for levying taxes with a real approach to equity. It consists in a tax on the yield or income from the forest whenever an income is received. Such a tax may be applied to any forest, however managed, on the basis of actual returns. It simply means to take a certain percentage of the returns and this should of course be relatively large. In the case of our present iniquitous system, it has been shown possible to deprive the owner through a long period of years of as much as 50 or even 75 per cent of his final return. An income tax of 20 or 25 per cent therefore would be just and humane. Referring to the example just given to illustrate the expectation value method, 20 per cent of the income of \$150 or \$30 if taken as taxes, would be precisely the same as an annual tax of one per cent on the expectation value of \$8.47. While the expectation value method is used in parts of Europe, it is not feasible in this country. A tax on yield makes it unnecessary to estimate future values. It does not depend on a fluctuating rate of money value. It is in no sense based on supposition or guess work but upon actual returns received. If

an owner's timber is destroyed by fire, he would not lose the accumulated taxes as under the present system.

There would be many problems of administration to work out and there are practical difficulties which would be almost insurmountable if a deferred yield tax system were to apply at once to all standing timber. This is out of the question. Such a system must be introduced gradually and apply only to young forests or those just established. At first it should perhaps be applied only at the option of the owner.

The system would call for a separate classification of land which is at present impossible under the constitution of New Hampshire. A constitutional convention is to be held in Concord this

year and the duty of the delegates is obvious. The Constitution should be amended so that the Legislature may take up this problem of forest taxation and through suitable legislation give relief to those who would practice forestry by starting new forests and putting under better management those which are now under way.

The State of Massachusetts has already taken up the problem by passing a resolution through its legislature in 1911 and again in 1912, according to law and preliminary to amending the State Constitution so as to permit a separate classification of forest lands if the legislature so chooses. The proposed amendment will now be submitted to the voters of the State.

CHESTNUT BLIGHT WARNING

THE following warning to timber owners has been issued by the Pennsylvania Chestnut Tree Blight Commission:

"With the advent of Spring, the development and spread of the chestnut bark disease is especially noticeable, and unless owners learn how to recognize the pest, and promptly remove all cases of the blight, it is safe to predict that our native chestnut trees will be doomed to extermination. In the counties east of the Susquehanna river, in Pennsylvania, the conditions are regarded as exceedingly unfavorable and almost hopeless, but west of the river the outlook for saving the chestnut is far more encouraging.

"If the people of that part of the State co-operate with the Blight Commission, by felling the infected trees and destroying the diseased bark and brush, its further spread may be controlled. All trees showing infections, no matter how slight, should be removed at once and every particle of the diseased bark must be destroyed. This is the most practical and effective method of treating infected trees at the present time, and especially in sporadic cases. So far, no spray or application has been discovered that will remove or cure the disease, although there is no lack of remedies suggested by experimenters."

YALE BUYS FOREST.

Director Toumey, of the Yale Forest School, today announced that a pine forest, as an adjunct to the teaching of silviculture and forest operations, has been secured in the best white pine region of southern New Hampshire.

OPEN CHICAGO OFFICE.

Munsen-Whitaker Co., foresters of New York City, announce the opening of a Chicago office in charge of H. S. Sackett, formerly Chief of the office of Wood Utilization of the United States Forest Service at 512 Commercial National Bank Building, Chicago.

QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

Editor, AMERICAN FORESTRY:

Can you tell me if there is a public school in New Jersey where one can study forestry? If not, is there any college where one may work his way through the forestry course? I have a common school education but desire to take up forestry and am without the funds necessary to take the regular college course, being dependent upon what I can earn. I have been told that there is a forest school where one can take the course by promising to stay and work for the state for a specified time. Can you tell me if this is so and where the school is located? I will very much appreciate whatever information you can send me.

CHARLES HOCKENBURY,
Perth Amboy, New Jersey.

It is always difficult to get a technical education without some resources, and on the strength of what you write I can not strongly encourage you to pursue your intention. On the other hand there are schools at which a man can at least partly support himself while pursuing his studies. All things considered I suggest that you write to the Dean of the Forest School at Pennsylvania State College, State College, Pa., and to the Director of the Forest School at Cornell University, Ithaca, N. Y. From them you will learn what arrangements can be made. There are no forestry schools of any kind in this State, and the one to which you refer as offering instruction in consideration of a contract to work for the State is located in Pennsylvania, and as I understand is open to citizens of that State only. In whatever you do let me urge you to bear in mind that no man can hope to be a successful forester who is not fully prepared, first as to a liberal general education and next as to the full course of technical studies. Judging by your letter the full four years' course at Pennsylvania State College, or at Cornell should qualify you to fill a forester's position. There have been men who entered forestry by the side door so to speak, but the time for doing that is past. One who is not fully prepared will have as little chance of winning out as the lawyer or doctor who takes his degree from one of the diploma mills. I shall be glad to give you any other information that you want, or to

talk with you if you care to come to Trenton for that purpose.

ALFRED GASKILL,
New Jersey State Forester.

Editor AMERICAN FORESTRY:

I was much interested in your article in this month's *American Forestry*, on the propagation of deer and elk. In one paragraph of this article you state that a property of 160 acres can be fenced for about \$200 for elk and slightly more for deer. Will you kindly let me know what kind of fence you would suggest for this purpose and from whom to buy.

ARTHUR H. HACKER,
Staten Island, N. Y.

I refer you to a letter from Howard Eaton, of Wolf, Wyoming, in this same number for much information on the subject.—
Editor.

Editor AMERICAN FORESTRY:

Will you kindly advise me what kind of trees I should plant in my garden?

E. W. DURANT, JR.,
Charleston, S. C.

Mr. George B. Sudworth, dendrologist of the Forest Service, answers this question for *American Forestry* as follows: I take pleasure in suggesting that the following trees should give satisfaction if planted on your property in South Carolina. I could advise you better if I knew the exact location of the proposed plantation and particularly the nature of the soil there. However, I am sure that the trees suggested will prove satisfactory and be well adapted for your purposes. The oaks and other broadleaved species suggested for use are designed to serve as shade trees. I have added three coniferous trees which I imagine you can well use as a matter of variety somewhere with the other trees:

Deodar Cedar (*Cedrus deodara*).
Italian Cypress (*Cupressus sempervirens*).
Cryptomeria (*Cryptomeria japonica*).
Water Oak (*Quercus nigra*=*Q. aquatica* of nurserymen).
Laurel Oak (*Quercus laurifolia*).
Willow Oak (*Quercus phellos*).
Magnolia (Evergreen), (*Magnolia grandiflora*).
Southern Winged Elm (*Ulmus alata*).

STATE NEWS

Maine

Members of the Kennebec Valley Protective Association, and their guests, representing timberland interests valued at fifty million dollars, enjoyed a banquet at Augusta, Me., on May 10, covers being laid for fifty. Hon. Forrest Goodwin, of Skowhegan, was the toastmaster, Governor Frederick W. Plaisted complimented the association on the good work it is doing, and hoped that similar associations would be formed throughout the State. J. Gervin Peters of the Forest Service spoke on the private co-operative fire protection under section two of the Weeks Act and expressed the hope that an adequate fire protection fund of two cents an acre may in the future be secured. Attorney General Pattangall urged the active co-operation of all timberland owners in conserving the forests; Hon. J. P. Bass spoke of the forest conservation and forest protection legislation in the State and President W. R. Brown, of the New Hampshire Timberland Association, describing the methods and the work of his own association and suggested a federation of the Eastern associations, as well as those of the West, for more efficient protection. Governor Bass, of New Hampshire, in a letter regretting his inability to be present alluded to the fact that Maine was the first State to operate a system of mountain lookout stations for the protection of forests against fires. Joseph Williamson, of Augusta, spoke on a system of insurance of timberlands which he believed would raise the price of the lands and make them better investments.

Colorado

W. G. M. Stone, President of the Colorado State Forestry Association, writes that:

"Colorado has been one of the leading State hatcheries of opposition to the Forest Service. The principal spawn produced have been State's rights, retardation of mining, landlordism, curtailing settlement of the State by driving home-seekers to Canada by hundreds (?) of thousands, etc.

"These hatcheries have fallen into the hands of politicians and men eager to seize upon the natural resources of the Western States; hence the Lafferty Bill (H. R. 2980) in the House, and the Burnham amendment to the House Agricultural Appropriation Bill (H. R. 18900) now in the Senate.

"The aim of these measures is to get the Public Domain away from the Government into the hands of the several States embracing the public lands and thence into the hands of private and corporate owners at the earliest possible moment.

"As applied to Colorado much misrepresentation and sophistry have been employed by the emissaries of the movement by likening the Western States to the Eastern, when in fact they cannot be compared. Their physical conditions are as different as day and night.

"If the matter of turning the Forest Reserves over to the States were submitted to the people of Colorado, the measure would be voted down many to one. It is really a question of water supply and irrigation, and Colorado is in no condition, at this time, to take the public domain and care for the forests as the Forest Service is now doing. If the Forest Reserves should go into politics at this time they would simply go to the Bow-wows.

New Jersey

The Forest Park Reservation Commission of New Jersey has issued a circular letter to the township committees of the State calling their attention to the danger of forest fires arising from uncared-for roadsides on which brushwood is allowed to dry. The commission points out that "aside from its value in curtailing the number of fires started, a properly or even reasonably well-cared-for roadside affords in many instances the only secure line of attack in fighting an advancing fire." The State laws governing this matter are also quoted in the circular for the benefit of the committees.

Missouri

In co-operation with the United States Forestry Service the Forestry Department of the Missouri Agricultural College has started an experiment to determine the species of basket willow best suited to the climate of Missouri. The State has a large area of land lying along its rivers which is subject to annual overflow and is, therefore, not suited for ordinary crops, but which would be admirably adapted to growing the basket willow.

An acre of suitable land will produce from 1,000 pounds to 1,300 pounds of willow whips each year. They have an average value of five to seven cents a pound. The demand for willow rods of high grade, for the manufacture of baskets and willow furniture is constantly increasing. At present the United States imports over 1,000,000 pounds annually. It is believed that there is a large future for the industry in Missouri.

After determining the proper species for the State, the Agricultural College will endeavor to foster the industry by the distribution of cuttings.

Tennessee

In parts of the South, notably in Tennessee, farmers are dismantling rail fences thirty to forty years old to supply, at good prices, the lead pencil manufacturers of the East with red cedar wood. Over vast districts the only vestiges remaining of the red cedar forests that once supplied the pencil, the box, and, to a large extent, the furniture industry, are to be found in this form, or in the interior finish of ancient wooden homes.

Minnesota

"Good roads have an important bearing on forest fire protection," says State Forester Cox of Minnesota. "They not only give the State force a way to get in the forests but make it easier to get help in fighting the fires. The proposed International Falls—Twin City road will divide the northern part of the State into two forest regions, and can be used as a fire break to protect either one of the sections in case the other one is fired. The forest law of 1911 makes it necessary for all slashings and other debris to be disposed of. This is being done in all construction work and the Elwell roads which will go through this section will give the forest service effective fire lines."

It is the hope of the forest service that several great trunk roads be built in the Northern part of the State with laterals running to them. Several roads are suggested by Mr. Cox as being of great value to the forest service.

New York

The work of reforestation is being carried on at a good rate by Manager Switzer, of the Salisbury Steel and Iron Company of Dolgeville. Mr. Switzer this year planted 10,000 trees of the white pine, Norway spruce and similar varieties, obtaining his seedlings from the State. This makes a total of 40,000 trees that have been planted by Mr. Switzer within the past few years. They are all located in the watershed from which this village derives its municipal water and will naturally help very much to ensure a continuous supply of that water. Ultimately over 50 acres of land will be reforested by Mr. Switzer in this manner. The kinds of trees selected are specially adapted both as to climate and soil conditions to the territory in question. All that have been planted show a good growth and are thriving.

Kentucky

The Civic League of Lexington is up in arms because of the fact that many shade trees in that city are being destroyed in the process of street and sidewalk construction. The league has appealed to the city authorities to prevent, as far as possible, the removal of the trees in street construction.

In some instances, it is claimed by the league, entire blocks have been denuded of rows of handsome maples and oaks. Property owners, as a consequence, are uniting their protests with the appeal of the Civic League. They are right in protesting, for the trees should be spared wherever it is possible to do so.

Massachusetts

Stringent precautionary action against the white pine blister rust have been taken by the State Board of Agriculture when in an official order signed by H. T. Fernald, State Nursery Inspector, the importation of pines of all kinds having the leaves in groups of five, from any part of Europe into Massachusetts after June 1, is prohibited.

This action was taken because of the prevalence upon white pine trees, and their four varieties, of a very dangerous disease known as the white pine blister rust. This disease has practically ruined the growth of the white pine in Germany and France. Once established here, it would kill all young pines of the five-leaved group, and ruin the larger pines of the State forests.

Three places in Massachusetts are known to be infected with the white pine blister rust disease, but until the inspection by the nursery inspectors is completed late in this month, the exact amount of damage will not be definitely known.

This year there have been approximately only 10 shipments of young trees made into Massachusetts. Of these two were discovered by Deputy Nursery Inspector W. S. Regan to be infected and were promptly condemned.

Vermont

The Vermont State Forester is making extensive plans for the spring's work of reforestation on the various lands belonging to the State.

The series of experimental plantations on the Downer State Forest in Sharon will be continued by the planting of about 20,000 trees of the following varieties: White, Scotch and Austrian pines, Norway, and white spruce. The trees previously planted on this tract have done remarkably well and are now of great value in connection with the annual summer school held by the State Forester in co-operation with the college of agriculture of the University of Vermont.

A great deal of planting is to be done during the season by corporations and private owners. The demands upon the State Nursery have been unprecedented, over one hundred orders having been received ranging in amount from 1,000 to 60,000 trees. This largest order is made by the Rutland Light and Power Co., for the protection of the watershed in Chittenden and Rutland.

Oregon

Announcement has been made by the State Board of Forestry that there will be 65 men appointed in Oregon under the \$10,000 appropriation received from the Government through the Weeks law, these men to work in Oregon in patrolling the headwaters of the navigable streams of the State.

The State Board of Forestry also made announcement of completion of its manual and handbook for fire wardens in which the general policy of the Board for this year is largely announced.

In the appointment of the men under the Weeks law there will be about 57 of the men stationed west of the Cascade Mountains and the other eight will be placed east of the mountains. It was the intent of the law to protect the headwaters of navigable streams and the main navigable streams are west of the Cascades. The men west of the mountains will be apportioned from one to seven in various counties, according to the size of the counties, the quantity of the timber involved and the nature of the streams arising in the respective counties.

Michigan

At a recent meeting of the Michigan State Board of Agricultural Comfort, A. Tyler, of Coldwater, Branch County, was appointed to aid in the establishment and development of a system of forestry extension work in conjunction with agricultural extension work now being conducted by Michigan Agricultural College and Experiment Station.

The object of this work will be to create a State-wide sentiment favorable to this important and exceedingly valuable branch of Michigan agriculture. An effort will be

made to induce farmers and others interested to properly care for the farm woodlot which now is probably the most grossly neglected of our farm possessions. Much emphasis will also be placed on economical methods of improvement employing at first those within easy reach of the ordinary farmer.

Montana

Provision for the increase of the patrol force and other details looking to the more perfect protection of standing timber in the district of the Northern Montana Forestry Association were subjects of discussion at the annual meeting in this city Saturday. Through the annexation of more than 100,000 acres of the Big Blackfoot Lumber company and the Northern Pacific railway's holdings and an equal amount of individual tracts it was deemed advisable to increase the directorate from seven to ten members.

Wisconsin

Members of the State Forestry Board, who returned today from a four days' trip in Northern Wisconsin, reported that within the last four months practically 14,000 acres have been added to the forestry reserve at prices ranging from \$2.50 to \$4.50 an acre. Besides this, the State has under consideration the purchase of a 12,000-acre tract in the vicinity of Little Car Lake, near Tomahawk, from an old lumber company. It is believed this transaction will be consummated in a few days as a result of the board's visit. It is one of the prize pieces of land which State Forester E. N. Griffith has had his eyes on for the last three years.

NEWS AND NOTES**British Columbia Forest Act**

The British Columbia Government has passed the Forest Act for the creation of a forest protection fund, to which owners, lessees and licensees of timber lands are required to pay 1 cent per acre on their holdings. To the total sum thus secured the Provincial Government must contribute an equal amount from the public revenue. The entire sum will then be placed to the sole credit of the fund for the purpose of preventing forest fires. Every one agrees that the measure is a good one. The Lands Department has commenced the issuing of notices calling upon the owners, licensees and

lessees of holdings to contribute their cent per acre. All new licenses or renewals will be withheld until the contributions to the fund are made, so as to ensure the inauguration of the fire fighting apparatus at the earliest possible moment.

County Reforestation

As a result of the Act passed by the Ontario Government a year ago, empowering municipalities to engage in forestry work, the county of Hastings has taken steps to acquire waste lands for the purpose of reforestation.

Several counties in Eastern Ontario are now undertaking the reforestation schemes. These waste lands were being rapidly acquired by private parties for personal profit, but of late councils have awakened to the fact that these lands might just as well be reforested under municipal supervision and the profits to accrue be retained for the benefit of the whole people.

Turning Wornout Land Into a Forest

How an Ohio farmer is solving the problem of what to do with wornout land is told about in the June *Outing* by B. Sando. The farmer, he explains, owns an old homestead of sixty acres which he is desirous of keeping in the family. He does not live on the place, however, for the reason that farming on it has of late years been a decidedly losing proposition. He has, therefore, decided to plant the entire tract in trees. Already 35,000 Norway spruce have been set out, three and one-half feet apart each way on an area of about eleven acres.

These trees will be cut, as they become large enough, for Christmas trees. Chestnut seedlings will be planted in the spaces left by the removal of the spruce, and it is expected that these will come into bearing by the time the last spruce is cut.

In addition to the spruce, hardy catalpa, black locust, elm, box elder and sycamore have been planted. It is planned to put the entire sixty acres in forest within five or six years.

The owner is wise in planting several kinds of trees instead of confining himself to one species. His forest will be producing six or seven kinds of lumber, chestnuts and Christmas trees, all at the same time.

Sunken Forest Uncovered

A prehistoric forest has been brought to light by the recent storm weather and heavy seas at Freshwater West, on the south Pembroke-shire coast, England. The action of the waves has resulted in the washing away of great quantities of sand, and there is now exposed to view a sunken forest of about a quarter of an acre in extent.

Where there was a stretch of unbroken yellow sand there is now a mass of black rocks and huge black gnarled trees, with their roots embedded in the rocks and earth. The trunks of these trees in many cases are in splendid preservation. In some cases the wood has simply changed color, while in others it is of the nature of coal. Most of the trunks are encrusted with standstone, and it is probably due to this that they are so well preserved.

It is evident that at some far distant period the land at this place was covered with a dense forest, and that there was either a subsidence or that the water undermined the cliffs, and that there was a huge landslide, which led to a large crack being engulfed in the sea. This was again covered with a layer of sand only to be laid bare once more.

Tool Caches In The Forests

According to Forest Supervisor E. N. Kavanagh, fire protection plans for the Big Horn forest this year include the location of a large number of tool caches in different parts of the forest for use in suppressing fires. Provision for camp equipment and food supplies for the fire fighters has also been made and from all indications the fire fighting organization will this season be in better shape than ever before to handle possible fires.

"We are making a strenuous effort to get our fire fighting organization in better shape," said Supervisor Kavanagh, "and plan to handle the fire situation on the forest in a manner similar to that followed by city fire departments, with the exception that we must naturally depend to a large extent upon the settlers of the surrounding country for assistance in case of serious fires. Lines of communication for obtaining information regarding fires and diffusing the information thus acquired to all interested in their suppression have already been established, so that it will be virtually impossible for any fire to gain more than a few hours' start on us.

"The first necessity in fighting a fire is getting assistance to combat it, and the second, to furnish the fire fighters with necessary tools. In case of a bad fire, provision for food supplies and camp equipment must also be made.

The Largest Live Oak

A woman in South Carolina boasts that her State has the largest live oak in the world. She says: "On the lawn of Middleton Place, near Charleston, there stands the sovereign of South Carolina live oaks. The age of this tree, as of many others near it, is beyond the knowledge of man. The waist of the trunk measures 36 feet 6 inches. Its spread from tip to tip is 126 feet. This is, as far as I can learn—and I have investigated quite a bit—the largest oak tree in the world.

"Another Middleton Place specimen is probably the most beautiful in existence and second in point of size, having a trunk 27 feet in circumference. Another notable live oak is to be found on one of the terraces, near the parterre. Its waist measurement is only 23 feet 4 inches, but it has a spread from tip to tip of 170 feet.

"I heard of an oak tree at Meggetts, S. C., that was, and still is, the talk of the countryside. Conductors on the trains tell strangers of its great size. I sent to Meggetts and had measurements of the tree made. The trunk was only 25 feet in circumference and the spread 125 feet.

Hanging Forest Fire Starters

Up in Alaska there is a bitter feeling against those who cause forest fires. This is not strange, but the Alaskans are carrying things to the very extreme and a vigilance committee has been formed whose duty it shall be to hang every offender. The Yukon Valley is described in press dispatches in the latter part of May as being a roaring furnace, and this means that great property damage is being done. Now, what stirs these dwellers of the North into such action is the recognition of the fact that in the greater number of cases these fires are started by the carelessness of some individual. They do not consider that it is right that one man, because he did not use the discretion that mature years ought to bring, should inflict on others such damage as a forest blaze of any magnitude always entails.

Fighting The Beetle

The government is again taking up the fight against the small beetles that have been ravaging the forests of eastern Oregon. This year, however, the official in charge of the work expects to have a much easier task than last season, when more than \$15,000 was expended near this city in the war on the little insects.

Last year in the work large numbers of trees were cut down and burned and this year the men will cruise the area worked last year, making observations of the success of the work. They say the work last year was quite thorough and expect to find it was quite successful, leaving this section of the Whitman national forest practically free from the bugs, with but few isolated trees left standing for treatment.

Pennsylvania Railroad Tree Planting

The growing scarcity of timber suitable for manufacture into railroad ties, which has been responsible for a rapid increase in the cost of ties in recent years, has led the Pennsylvania to adopt a conservation scheme which includes the production of trees for its own use.

More than four and a half million trees have been planted by the Pennsylvania in the past ten years. Last year alone 515,703 trees were transferred from the company's nursery at Morrisville, Penn., to permanent places on railroad property. In 1909 1,000,000 young trees were set out.

At the nursery the Pennsylvania has in operation 36 acres which are kept up to practically maximum production. In 1911 483,148 forest trees were shipped from the nursery for company use, while an additional 46,558 ornamental trees and shrubs were used by the various divisions. The present stock on hand at the nursery is 2,296,833, of which 2,072,166 are forest trees, and 224,667 ornamental plants.

Forest Experiments

Plant Economologist A. W. Sampson, of the government forest service, will have charge of the establishment of a government grazing experiment station at Manti, Utah.

Assistant District Forester O. M. Butler, of the silviculture department, and Assistant District Forester Homer E. Fenn, of the grazing department, will accompany Mr. Sampson to the Manti district. The foresters will experiment in tree reproductions, sheep grazing on streams, and establish a forest plant nursery to raise seed for grasses that are best adapted for that locality.

Fast Growing Eucalyptus

L. M. Pratt, president of the Pratt Eucalyptus Investment Co., of Los Angeles, Cal., sends a clipping which describes a Eucalyptus tree three years old, grown without irrigation in one of his plantations, closely surrounded by other trees of the same age. It measured 8½ inches in diameter, breast high; 12½ inches in diameter at the butt, and 55 feet in height at three years of age. A half acre plot in which this tree is located was measured when just three years old. The trees showed an average diameter of 5½ inches, and an average height of 55 feet. These trees are doubtless the largest trees for their age ever produced in a California plantation, if not in the world. It is almost unbelievable that trees growing so rapidly produce a timber as hard and tough as hickory, which takes 90 years to attain a 12-inch diameter.

Raising Big Tree Seedlings

The Forest Service is raising several acres of big tree seedlings on the Tahoe National Forest in California, at a more northerly point than any natural big tree grove. While the giant sequoias are found in the forests of the Sierras at various points throughout a total range of some 250 miles, in the northern two-thirds of this range there is practically no natural reproduction. It has consequently been a question whether the species would not practically disappear from this region when the present mature trees die.

The most northern existing grove of big trees is on the Tahoe Forest, but about 34

miles southeast of the site selected for planting. This site is on a moist flat not far from Nevada City, and is about 2,700 feet above sea level. The first seeding was done in the fall of 1910, with very successful results, and last fall an additional area was seeded.

The method used in planting the seed was that known to foresters as "the seed spot method." Spots about six feet apart each way were prepared by pulverizing the

earth with a garden hoe. Seeds were then dropped on these spots and lightly pressed in the soil with the foot. The flourishing condition of the young seedlings gives good reason to expect a future growth of big trees at this point. With protection of forests from fire there seems to be no reason why the big trees should disappear; even though scientists regard them as survivals from a past age, botanically speaking.

BOOK REVIEWS

Forestry in New England: By Ralph C. Hawley and Austin Hawes. New York; John Wiley & Sons. 1912. Pp. XV + 479. Illustrated.

Teachers, students and practitioners of forestry will welcome this book which deals in so comprehensive and authoritative a manner with the specific forest problems of New England. The authors are practical foresters who have devoted years of study to forest conditions and management in the East. In the light of their own experience they have gathered together and made readily available the results of investigations which have been made from time to time, the records of which have previously existed in a heterogeneous mass of bulletins, articles, and reports. In preparing this book the authors had in mind two distinct purposes: First, to present a treatise or manual of practical value to all classes of land owners in the East; and second, to produce a textbook treating of forestry in New England. The latter is greatly needed at this time, especially in the various agricultural colleges where courses in forestry are given and where it is essential that thorough instruction in the

forest problems of the northeastern United States be furnished. There is a still wider field for a book dealing with a specific portion of the country, so arranged as to serve as a ready guide for owners of woodland in that section. It has evidently been the aim of the authors to present the matter in the simplest and least technical form possible without sacrificing accuracy, to the end that readers not familiar with forestry may have no difficulty in following the discussion throughout.

As a textbook for post-graduate schools giving the highest grade of instruction in forestry this book will have a greater value for its detailed discussion of New England forests than for the portion dealing with general forestry. But for numerous undergraduate schools giving a slightly lower grade of instruction all portions of this book will prove useful. To the owner of woodlands in the region it will afford not only general information in regard to forestry and its application in New England, but also practical assistance in the detailed treatment of his local forest problem.

S. J. R.

EDUCATIONAL

The Biltmore Forest School

The early spring found the Biltmore Forest School returned from its winter quarters in the German forests and encamped near Biltmore, N. C., at the snug logging camp of the Champion Lumber Company, owners of 135,000 acres of the finest timberland existing in the Southern Appalachians. No better setting for the course in "Logging and Lumbering" in which the school is now engaged can be imagined than that met at "Sunburst." Here the mountains rise to elevations of 6,550 feet. The slopes are steep, and the stumpage is unequally distributed over the entire area. Thus it happens that the logging problems confronting the Champion Lumber Co., whose hospitality the Biltmore Foresters enjoyed at Sunburst, are very diversified and intensely interesting.

Near the camp of the Biltmore Forest School, some 16 miles down the meanders of beautiful Pigeon River framed in flowering mountain laurel (*Calmya latifolia*), rises the smoke from the giant fibre works owned by the friends of the Biltmore Forest School, the Champion Fibre Co. There is the hugest fibre plant, by far, to-day existing in the South. 500 long cords of spruce, hemlock, pine, basswood, and notably chestnut are here converted, every day, into fibre by the sulphite and by the soda process of manufacture.

The lecture work during the stay of the Biltmore Forest School in the camps of the Champion Lumber Co. occupied the entire forenoon. Logging and lumbering was the main topic of Director C. A. Schenck's course. Dr. House lectured on plant physiology and morphology; Dr. G. L. Sioussat

on Economics; Mr. H. B. Hudson on Law for Lumberman; Mr. Franklin Sherman on Entomology and Mr. C. S. Brimley on General Zoology. The entomological and zoological lectures were going hand in hand with the field work.

From its Southern spring camps, the Biltmore Forest School is about to move to its Summer camps at Cadillac, Mich. En route to Michigan, the School visits the giant paper plant of the Champion Coated Paper Co., with which the Champion Lumber Co. and the Champion Fibre Co. are affiliated) at Hamilton, Ohio. The three steps in the manufacture of paper are thus studied, from the stump of the tree to the consumer. Thus it happens that the students become acquainted, in the course of their travels, with the various steps of the conversion of the trees into the necessities of life.

In August, the Biltmore Forest School moves for its fall camps at Marshfield, Oregon. In October, the School sails for its winter quarters in the German forests.

Mr. Spring Goes to Cornell.

The trustees of Cornell University have appointed Mr. Samuel N. Spring, of New Haven, Connecticut, professor of forestry at Cornell University, and he will begin his work at Ithaca at the opening of the next college year. Mr. Spring will teach the courses in forest planting and the forest nursery, forest protection, forest policy, and a general introductory course.

Mr. Spring graduated from Yale College with the degree of B. A. in 1898. For the

next three years he was engaged in a wholesale dry goods business in Chicago, after which he returned to the Yale Forest School, graduating from that institution in 1903, with the degree of Master of Forestry. The next two years were spent at the University of Maine, where he was professor of forestry in charge of the department. He spent the summers of 1902, 1903 and 1904 in work in New England for the U. S. Forest Service.

From June, 1905, until January, 1909, Mr. Spring was constantly in the employ of the U. S. Forest Service, holding successively the positions of forest assistant, assistant forest inspector, chief of the section of co-operation in the Office of Extension, and chief of the Office of Extension. He was engaged in private forestry work from January, 1909, until the fall of that year. Since the fall of 1909, he has been State forester of Connecticut, forester to the Connecticut Experiment Station at New Haven and special lecturer in the Yale Forest School and at the Connecticut Agricultural College—all of these positions have been held continuously since the fall of 1909.

Mr. Spring is a director of the American Forestry Association.

His publications include two articles on "Forest Fires" and "White Pine," in the reports of the Maine Forestry Commission for 1904-'06; Bulletin 63, U. S. Forest Service, "Natural Replacement of White Pine in New England"; Circular 41, U. S. Forest Service, "Forest Planting on Coal Lands in Western Pennsylvania"; "Forest Fire Manual," published by the State of Connecticut; "Report of the State Forester of Connecticut for 1910."

CURRENT LITERATURE

MONTHLY LIST FOR JUNE, 1912.

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Proceedings and Reports of Associations, Commissions, etc.

Annuaire des saux et forêts pour, 1912, vol. 51. 379 p. Paris, L. Laveur, 1912.

British Columbia—Game and forest warden. Report, 7th, 1911. 19 p. Vancouver, B. C., 1912.

India—Baluchistan—Forest dept. Progress report of forest administration for 1910-11. 34 p. Calcutta, India, 1911.

India—Madras presidency—Forest department. Annual administration report, 1910-1911. 192 p. Madras, 1912.

India—United Provinces—Forest dept. Annual progress report of forest administration in the western and eastern circles for the forest year 1910-1911. 119 p. Allahabad, India, 1911.

Indiana—State board of forestry. Eleventh annual report, 1911. 372 p. il. Indianapolis, 1912.

Mexico—Fomento, Secretaria de-Bosques, Departamento de Cartilla forestal, no. 1-3. pl. Mexico, 1909-11.

St. Petersburg—Lyesnoi institut. Izvestiya (Contributions), vol. 22. 329 p. pl., tables. St. Petersburg, 1912.

Switzerland—Eidg. departement des innern—Inspektion für forstwesen, jagd und fischerei. Etat der schweizerischen forstbeamten, mit wissenschaftlicher bildung, Jan. 1912. 21 p. Bern, 1912.

Switzerland—Eidg. departement des innern—Inspektion für forstwesen, jagd und fischerei. Rapport, 1911. 20 p. Bern, 1912.

University of Nebraska—Forest club. The Forest club annual, vol. 4, 1912. 160 p. pl. Lincoln, Nebr., 1912.

Forest History

Winkenwerder, Hugo. Forests and American history. 30 p. Berkeley, Cal., University of California, 1912.

Forest Education*Arbor Day.*

Idaho—Dept. of public instruction. Arbor day manual, 1912. 24 p. Grangeville, Idaho, 1912.

Forest Legislation

New Jersey—Forest park reservation commission. Laws of New Jersey relating to forestry. 1912. 35 p. Trenton, N. J., 1912.

New York—Conservation commission. The conservation law in relation to fish and game as amended by the legislature of 1912. 284 p. Albany, N. Y., 1912.

New York—Legislature. An act to amend the conservation law generally, and in relation to lands, forests and public parks. 40 p. Albany, N. Y., 1912.

Forest Botany*Trees, classification and description*

Hall, Harvey Monroe, and Hall, Carlotta Case. A Yosemite flora; a descriptive account of the ferns and flowering plants, including the trees, of the Yosemite national park. 282 p. il., pl. San Francisco, Paul Elder & Co., 1912.

Mexico—Fomento, Secretaria de-Bosques, Departamento de Catalogo forestal de la Republica Mexicana. 29 p. Mexico, 1912.

Woods; classification and structure

Krueger, Theo. Notes on bark structure. 15 p. Lincoln, Nebr., University of Nebraska, 1912.

Mell, Clayton, D. and Brush, Warren D. Quebracho wood and its substitutes. 12 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 202.)

Silvics*Studies of species*

Phillips, Frank J. and Mulford, Walter. Utah juniper in Central Arizona. 19 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 197.)

Forest soils

Ramann, Emil. Bodenkunde. 3d ed. 619 p. il. Berlin, J. Springer, 1912.

Silviculture*Planting*

New Hampshire—Forestry commission. Reforesting waste and cut-over land. 4 p. Concord, N. H., 1912. (Circular 2.)

Forest Protection*Diseases*

Smith, Ralph E., and Smith, Elizabeth H. California plant diseases. 155 p. il. Sacramento, Cal., 1911. (California—Agricultural experiment station. Bulletin 218).

Fire

Allen, E. T. The ambitious tree; a story for western children. 8 p. Portland, Ore., Western forestry and conservation association.

New Jersey—Forest park reservation commission. Forest fire manual, 1912. 38 p. Trenton, N. J., 1912.

Oregon—Forestry, State board of. Fire warden's hand book; Oregon forest fire laws, 1912. 45 p. Salem, Ore., 1912.

Forest Management

Frothingham, Earl H. Second growth hardwoods in Connecticut. 70 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 96.)

Range management

Thornber, J. J. Native cacti as emergency forage plants. 52 p. pl. Tucson, Ariz., 1911. (Arizona—Agricultural experiment station. Bulletin 67.)

Forest Utilization*Wood using industries*

Gould, Clark W. and Maxwell, Hu. The wood-using industries of Tennessee. 14 p. Nashville, Tenn., Southern lumberman, 1912.

Maxwell, Hu. Wood-using industries of Michigan. 101 p. tables. Lansing, Mich., Public domain commission, 1912.

Forest by-products

Gorkom, K. W. van. Cinchona in Java from 1872 to 1907. 72 p. Calcutta, Supt. of gov't. printing, 1912. (Agricultural ledger, 1911, no. 4.)

Wood technology

Wilson, Thomas R. C. Strength of cross-arms. 15 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 204.)

Wood preservation

Bateman, E. Quantity and quality of creosote found in two treated piles after long service. 8 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 199.)

Peters, E. W. The preservation of mine timbers. 27 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 107.)

Auxiliary Subjects*Agriculture*

Giles, H. F. The logged-off lands of western Washington. 71 p. il., map. Olympia, Wash., Bureau of Statistics and immigration, 1911.

Water power

Brown, Rome G. Limitations of federal control of water powers. 64 p. Wash., D. C., 1912. (U. S.—62d Congress—2d session. Senate document 721.)

United States—National waterways commission. Final report, 579 p. il., diagr. Wash., D. C., 1912.

Floods

Pittsburgh, Pa.—Flood commission. Report of the Flood commission of Pittsburgh, Pa., containing the results of the surveys, investigations and studies made by the commission for the purpose of determining the causes of, damage by and methods of relief from floods in the Allegheny, Monongahela and Ohio rivers at Pittsburgh, Pa. 253, 452 p. pl., maps, diagrs. Pittsburgh, Pa., 1912.

National parks and monuments

United States—Dept. of the interior. Report on Platt and Wind Cave national parks, Sullys Hill park, Casa Grande ruin, Muir woods, Petrified forest, and other national monuments, including list of bird reserves. 46 p. il., maps. Wash., D. C., 1912.

*Periodical Articles**Miscellaneous periodicals*

American city, Feb. 1912.—Municipal control of shade trees, by W. Solotaroff, p. 488-90.

American city, March, 1912.—Best species of trees for city streets, p. 565-9.

American homes, March, 1912.—Hints on house flooring and interior finish, supplement 4.

American homes, April, 1912.—Proper care of shade trees in cities and towns, supplement 25.

Annals of botany, April, 1912.—The Podocarpaceae, by Walter Stiles, p. 442-514. On the development of the female strobilus in Podocarpus, by L. S. Gibbs, p. 515-71.

Country life, April 1, 1912.—England's New forest, by R. W. Snedden, p. 59-60.

Country life in America, June 1, 1912.—A log cabin in Vermont, by A. J. Groat, p. 59-60; Building a log cabin, by Joseph B. Ames, p. 62, 82.

Craftsman, May 1912.—Sugi finish; a Japanese decorative treatment of woods, p. 220-4.

Craftsman, June 1912.—Bringing country beauty to the city streets, by Arthur Hay, p. 271-80.

Garden magazine, June 1912.—Long-lived evergreens for gardens, by W. Miller, p. 310-13.

Gardeners' chronicle, April 27, 1912.—Exotic forest trees, by G. W., p. 277.

Gardeners' chronicle, May 11, 1912.—Exotic forest trees, by Herbert Maxwell, p. 323.

Guide to nature, April 1912.—The chestnut trees must go, p. 395-7.

Lippincott's monthly magazine, June 1912.—Timber bonds, by Edward S. Meade, p. 892-6.

Mycologia, May 1912.—Preliminary notes on three rots of juniper, by George Grant Hedgcock and W. H. Long, p. 109-14; Notes on some western Uredineae which

attack forest trees, by George Grant Hedgcock, p. 141-7; Notes upon tree diseases in the eastern states, by P. Spaulding, p. 148-51.

Outlook, April 27, 1912.—New forests for old, by O. W. Price, p. 947-55.

Penn. state farmer, May 1912.—Application of the Weeks law in the White Mts., by S. L. Wolfe, p. 146-51; Chestnut bark disease, by H. R. Fulton, p. 151-5; The attitude of the railroads towards forest fires, by E. A. Sterling, p. 162-7; Recent developments of the course in forestry at Penn state, by W. D. Clark, p. 163-70; A chronological statement of the progress of forestry in Pennsylvania, by George H. Wirt, p. 171-4; Utilization of waste land for the production of trees, by J. B. Berry, p. 174-80.

Phytopathology, April 1912.—The chestnut bark fungus, *Diaporthe parasitica*, by C. L. Shear, p. 88-9.

Popular science monthly, June 1912.—The national parks from the scientific and educational side, by Laurence Schmeckebecker, p. 531-47.

School science and mathematics, April 1912.—Forestry in geography, by E. R. Jackson, p. 271-7.

Science, May 10, 1912.—The fungus of the chestnut-tree blight, by W. G. Farlow, p. 717-22.

Torreya, June 1912.—Induced hermaphroditism in *Acer negundo*, by C. G. Fraser, p. 121-4.

Yearbook of the United States Dept. of agriculture, 1911.—Tree planting by farmers, by C. R. Tillotson, p. 257-68; The business aspect of national forest timber sales, by T. D. Woodbury, p. 363-70; Plant introduction for the plant breeder, by D. Fairchild, p. 411-22.

Trade journals and consular reports

American lumberman, May 18, 1912.—Some construction timbers of the Philippines; red lauan, by H. N. Whitford, p. 34; Fir as a timber for cross arms, by A. S. Crosby, p. 45.

American lumberman, May 25, 1912.—A forestry specialist, H. S. Sackett, p. 1, 43; Paper making from yellow pine refuse, p. 35.

Canada lumberman, May 15, 1912.—The Indian a good forest ranger, p. 46-7.

Canada lumberman, June 1, 1912.—St. John river log driving operations, by G. Skiff Grimmer, p. 28-30.

Engineering magazine, April 1912.—Forest fires and the railways, by E. A. Sterling, p. 111-14.

Engineering news, April 18, 1912.—Wood block paving with cement filler, by A. J. Schafmayer, p. 738-9.

Hardwood record, May 25, 1912.—H. S. Sackett, p. 26-7; Lumber prices, by R. S. Kellogg, p. 27-9; New wood-staining process, by R. Grimshaw, p. 31; The figured wood game, p. 356.

- Hardwood record, June 10, 1912.—Tier-like structure of some woods, by S. J. Record, p. 38-9.
- Lumber trade journal, June 1, 1912.—Kiln drying long leaf pine, p. 41.
- Lumber trade journal, June 15, 1912.—The wood using industries of Texas, by Hu Maxwell and Chas. F. Hatch, p. 27-44.
- Lumber world review, May 25, 1912.—A definite state forest policy; New York state progress in reforesting the Adirondacks, by E. A. Sterling, p. 22-3.
- Mississippi Valley lumberman, May 31, 1912.—From tree to consumer; brief outline of lumber manufacturing processes and what it costs to put lumber on the market, p. 40.
- Mississippi Valley lumberman, June 7, 1912.—Wood waste and its utilization, by G. B. Frankforter, p. 40-1.
- Paper mill, May 11, 1912.—Forestry practice; what the International paper company is doing; its policy and work in Vermont, by B. A. Chandler, p. 16, 20.
- Pulp and paper magazine, May 1912.—Pulp wood regulations in British Columbia, p. 147-8; Experiments on ground wood at government laboratory, Wausau, Wis., p. 149-52; Qualities of Canadian pulp woods, by J. A. DeCew, p. 153-6.
- St. Louis lumberman, May 15, 1912.—How clothes pins are made, p. 29; The inlayers of Hanoi, p. 30; Loblolly, the king of southern pines, by J. A. Clark, p. 55; Men or trees; the problem of our logged off lands, by J. J. Donovan, p. 77; Adverse conditions affecting the lumber industry, by S. J. Carpenter, p. 51-2; Wood-using industries of Arkansas, p. 88.
- St. Louis lumberman, June 1, 1912.—The testing of wood paving blocks, by F. Kleeborg, p. 54.
- Southern lumberman, May 25, 1912.—Wood-using industries of Tennessee, by C. W. Gould, p. 39-52.
- Timberman, May 1912.—Handling lumber by monorail system in modern Pacific Coast Mills, p. 24-5; Practical demonstration of the value of the overhead logging system, p. 29; Adequate equipment is essential to land clearing on commercial scale, by H. G. Rich, p. 33; Difficulties to be surmounted in applying electricity to log haulage, p. 50-2.
- Timber trade journal, May 25, 1912.—The woods of Gaboon and their commercial uses, p. 984.
- Timber trade journal, June 1, 1912.—Cypress and some of its uses, p. 1042.
- United States daily consular report, May 16, 1912.—Paper-yarn fabrics, by A. E. Ingram, p. 631; Hemp fiber for paper-making, by George E. Anderson, p. 632-3.
- United States daily consular report, May 18, 1912.—Foreign lumber production and importation; Greece, by A. B. Cooke, p. 657-8; Foreign lumber production and importation; Siam, by C. C. Hansen, p. 658; Foreign lumber production and importation; Germany, by H. D. Spahr, p. 658-9; South African lumber imports, by E. A. Wakefield, p. 661; Australian timber industry, p. 663; Forest conservation in Scotland, by H. D. Van Sant, p. 664.
- United States daily consular report, June 3, 1912.—Pine lands of Nicaragua, by A. J. Clare, p. 906-7.
- West Coast lumberman, May 1912.—Spark arresters, p. 533-4.
- Wood craft, June 1912.—Design and construction of wood mantels and fireplaces, by John Bovingdon, p. 69-73; The effect of water content on wood, by S. J. Record, p. 82-4; The cork industry, by C. S. Winans, p. 84-5.
- Wood-worker, May 1912.—The making of quartered oak stock, by Chas. J. Brey, p. 26-7; West African mahogany, p. 30; Saw mills in India, p. 55.
- Forest journals*
- Centralblatt für das gesamte forstwesen, April 1912.—Ueber den einfluss verschiedener belichtung und extremer temperaturen auf den verlauf der keimung forstlichen saatgutes, by Gottfried Pittauer, p. 157-72; Die waldbrände von Porcupine und Cochrane, Kanada, by G. Pittauer, p. 193-5; Ueber Griechenlands wälder, by Otto R. Maresch, p. 195-6.
- Forest Leaves, June 1912.—Records and protection of plantations in foreign countries, by George A. Retan, p. 132-4; Forest reserves a state investment, by John L. Storback, p. 134-5.
- Forstwissenschaftliches centralblatt, April 1912.—Nonnenstudien, by E. Knoche, p. 177-94; Gedenken über die umtriebsfrage, by Wagner, p. 194-207; Eine neue saattmethode in gebirg, by Hauenstein, p. 207-17.
- Indian forest records, March 1912.—Note on the antiseptic treatment of timber in India, with special reference to railway sleepers, by R. S. Pearson, p. 1-107.
- Revue des saux des forêts, April 15, 1912.—Observations sur le climat, le sol et les essence forestières de la zone Méditerranéenne des Alpes-Maritimes, by A. Salvador, p. 225.
- Revue des saux et forêts, May 1, 1912.—Quelques observations sur les dégâts causés aux végétaux forestiers par la sécheresse de l'été 1911, by L. Parde, p. 257-60.
- Revue des eaux et forêts, May 15, 1912.—A propos de reboisement, by L. Pardé and J. Demorlaine, p. 289-92.
- Zeitschrift für forst-und jagdwesen, April 1912.—Die prüfung des kiefern-samens, by Haack, p. 193-222.
- Zeitschrift für forst-und jagdwesen, May 1912.—Neuere forschungen auf dem gebiete der bodenkunde, by Albert, p. 240-9; Die neueste Russische forststatistik, p. 313-16; Einfluss des kalkes auf das wachstum der pflanzen, by Frank Schwarz, p. 316-30.

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FORESTRY IN FORMOSA

BY R. KANEHIRA

TO the southwest of the mainland of Japan, with the Loochoo group as stepping stones leading in an almost unbroken line, lies an island which Portuguese mariners who sailed down its west coast, in the sixteenth century, gave the name of "Hha Formosa" (beautiful Isle); which is the name in European literature.

On the east coast the waves of the boundless Pacific are constantly washing the base of the lofty cliffs, some of them 6,000 feet high. On the south, the island is linked to the Philippines through the Bashee Channel, while on the west it is separated from the mainland of China by the Formosan Channel. This island together with the Pescador and other smaller islands adjoining it, lying between $25^{\circ} 30'$ and $21^{\circ} 40'$ north latitude, and 119° and $122^{\circ} 10'$ E. L., was ceded to Japan by China in 1895, as a result of the war.

The island extends from north to south in the shape of a leaf 264 miles long and 80 miles wide. A chain of mountains with *Sylvia* in the north and *Morrison* in the south, with their respective heights 11,470 and 13,880 feet, and many more high peaks between all covered with everlasting verdure, runs north to south through almost the entire length of the island. Under these geographical circumstances, the principal forests are found in the Central Chain of mountains, the savage district, while forest in the district which are under the Government administration were cut down or exploited or were brought to ruin on account of camphor manufacturing during the Chinese régime, so that none of these forests retain their characteristic sylvan features.

When the area of forest is figured

up according to the topography and the distribution of forests, it may be found that the total extent covers almost 7,107,000 acres, *i. e.* 67% of the total area of the entire island. Of these about 4,300,000 acres are in the savage district.

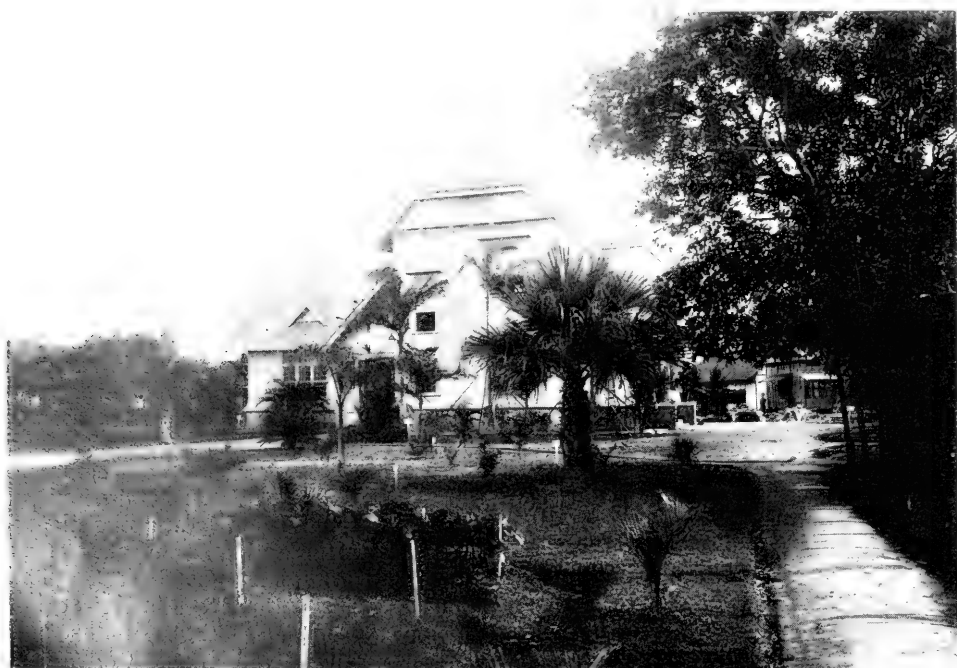
Topography of the island may be divided into two parts, mountain and plain districts. The former is the central range of mountain almost entirely of paleozoic formation, which runs from the north to the south, the latter lie mostly on the west sides of the mountain, practically a plain of alluvial formation furrowed by shallow creeks and rivers with some small hills and sandy dunes on the seashore.

Though the island is located between the tropical and subtropical zones, the climate presents great variety according to latitude. Thus we see tropical plants in the plain, while we have alpine plants on the peaks. As regard forests, the plain districts are mostly cultivated land, raising rice, sugar, tea, etc., and we do not find much forest there except a scattering of fuel trees such as *Acacia*, *Nephelium*, *Ficus*, and palms bamboos, etc. The mountain district is extremely variable and may be conveniently divided into three zones, the lower part of the mountains, the zone of evergreen broad-leaved trees; Coniferous forest; and the grassland on the summit. The evergreen broad-leaved tree region is almost entirely a mixed stand of many kinds of *Querci* and lauraceous plants.

The conifer region commences at an elevation of about 6,500 feet. The most predominating trees in this region are *Chamaecyparis*, *Tsuga*, *pinus*, and other needle-leaved tree. *Chamaecyparis*, commonly called cedar in America, is the most valuable and important



SOME OF THE SAVAGE PEOPLE WHO LIVE IN THE INTERIOR OF FORMOSA AND WHOSE HOSTILITY TO THE JAPANESE MAKES FOREST WORK IN THE INTERIOR DIFFICULT AND DANGEROUS.



THE JAPANESE EXPERIMENTAL STATION OF FORESTRY RECENTLY ERECTED BY THE GOVERNMENT IN FORMOSA.



A TYPE OF ONE OF THE MANY CAMPHOR MANUFACTURING KILNS WHICH ARE FOUND IN THE FORESTS OF FORMOSA.

tree in the island and is wonderfully large, sometimes attaining a diameter of even 20 feet or more, and producing the finest timber material. "*Taiwan-Sugi*" (*Taïwania cryptomerioides*) not only peculiar in botanical interest as an endemic genus, displays a fine feature of the forest. Here also those rare trees such as *Keterelia Davidiana*, *Cunninghamia Konishii*, and *Pseudo-tsuga Japonica* are found.

The grass land of the summits commences at about 12,000 feet and as is usually the case plays no important part in forestry.

Now to sum up the different kinds of commercial trees, they are:

Conifers—*Chamaecyparis* (2 kinds),

abundant; *Taïwania cryptomerioides* (endemic), fairly abundant; *Tsuga formosana*, fairly abundant; *Podocarpus* (several kinds), fairly abundant; *Libocedrus macrolepis*, fairly abundant; *Pinus* (several kinds), abundant.

Evergreen broad-leaved tree—*Camphor tree*, abundant; *Machilus* (several kinds), abundant; *Quercus* (several kinds), abundant; *Pasania*, abundant; *Alnus*, abundant; *Acacia* (2 kinds), abundant; *Nephelium*, abundant.

Beside these, there may be included *Keterelia Cunninghamia*, and many kinds of hard woods.

The bamboo is an important item in the island as it is used for building material, fence, wall frames, carrying



A VIEW OF A DENSE EVERGREEN BROAD LEAVED FOREST IN FORMOSA.



A SECTION OF ONE OF THE MAGNIFICENT BROAD LEAVED FORESTS WHICH ARE FOUND
IN FORMOSA.



THE "GOD TREE" IN THE FOREST OF ARISAN, FORMOSA.
THE DIAMETER OF THIS TREE IS ABOUT TWENTY-TWO
FEET.

sticks and furniture making. They are found over the whole island except in the mountain districts.

Since seventeen years ago when Formosa was ceded to Japan, what has the Government done to the forests of Formosa? The great difficulty in exploring the forests of the island is that most of the commercial forests are found in the savage districts, where the inhabitants have a very cruel habit of head-hunting, as is also found in some islands of the South Sea. The savage people extend over nearly 2,900 square miles; covering perhaps 60 per cent of the island and there is great necessity felt for defence against them. We are resorting to various measures of bringing

pressure upon them and of gradually inducing them to submission.

So the more this region is tranquilized, the more the timber industry will spring up.

At present, there does not exist any special work on the forestry of this island excepting those under described.

One of the most important items of Formosan forestry is the camphor industry. The trees are found usually in mixed forest together with other evergreen broad-leaved trees, and most of them are now in the savage districts.

The camphor product here is practically the monopoly of the world, and now forms one of the principal exports of the island. It has been in the Gov-



JAPANESE FOREST DEPARTMENT OFFICIALS IN UNIFORM AND COOLIES IN THE BAMBOO STAND NEAR ARISAN, FORMOSA.

ernment monopoly since 1899. In the Chinese régime, the crude and wasteful method of manufacture adopted by the Chinese camphor producer has been replaced by the advanced Japanese process, while in order to keep up a sufficient supply of material, efforts are being made towards propagation of the tree, by establishing nurseries in various parts of the island, the camphor forest thus being maintained with splendid results.

The *Arisan* forest timber industry is a rather peculiar phenomena that up to this time Formosa is importing a great deal of timber from the mother country, notwithstanding the fact that she has a considerable amount of commer-

cial forests. It is due to the fact that the island is topographically very steep and most of the forest being found in the savage district, it is consequently very difficult of access.

One of the most important timber fellings which is going to be made by the Government is the *Arisan* forest. This forest is particularly well known to the public. It is very dense virgin forest, perhaps unique in the size of the trunks and richness of its growth.

The area of the forest is only about 27,000 acres, but it contains 106 million cubic feet of conifers and 112 million cubic feet of hardwoods.

We are now going to explore the forest, by establishing a railway to the



TYPE OF THE HEAD HUNTERS FREQUENTING THE MOUNTAINS OF FORMOSA AND AGAINST WHOM THE JAPANESE FORESTERS HAVE TO CONTEND.

elevation of 7,000 feet and using modern methods for cutting and transporting the timber. We do not hesitate to declare that this forest produces such trees that both in shape and quality they will hardly find a rival.

Besides these we have lumbering on a small scale in many other places, in case of fuel trees for the sugar factories and some other kinds of hardwoods for cabinet work, of which the most important trees are: *Libocedrus*, *Diospyros*, *Biochofia*, *Pistacia*, etc. One thing which I ought not to omit to mention here is the pulp making from bamboos. We have a great deal of bamboo stand in the central part of the island, and recently a large pulp mill

has been established for that purpose. This will, I think, be the very first bamboo pulp mill in the world.

While the economic importance of the natural forest is being increased by their exploitation, it is important at the same time that secondary forest should take their place. The necessity, therefore, of the utilization for this purpose of mountain districts which were left to run wild in the administrative section of the preservation of the camphor forests, of planting trees in the most needed places as a preventive measure against flying sand, and in order also to maintain the purity of the mountain heads, caused the Government to take over large areas of land for the pur-



A PORTION OF THE VIRGIN FOREST OF ARISAN, FORMOSA.

poses of planting and reafforestation. There is now camphor forest of about 9,000 acres planted by Government and 15,000 acres by the people and beside this we have planted 10,000 acres in the reserve forest.

As the forest of the island is quite peculiar to that of the mother country both in species of trees and character, in order to investigate these factors we established here the Experimental Station of Forestry in 1911. The principal work which is now being done is the examination of the physical properties of Formosan trees and experiments on raising seedlings both of Formosan

trees and of foreign economic plants are also being made.

There are quite a number of species of economic tropical plants, which it seems possible to successfully acclimatize, such as fibre, spice, oil, rubber, etc. The Chinese are very ignorant of all idea regarding tree planting. Very few trees are seen in their villages and towns, either shade-bearing or garden trees. We, therefore, raise many seedlings here and distribute them sometimes for sale, sometimes free of charge, and sometimes we raise seedlings of these for afforestation.

THE FORESTRY OF FRANCE

BY WARREN H. MILLER, M. A.

IN a recent paper I gave a brief review of the forest practice of Germany as exemplified by a comprehensive inspection undertaken last year, in which the principal silvicultural areas of Germany were revisited after an absence of twenty years. Owing to the combined influence of species, soil and climate, clear cutting and replanting with seedlings may be said to be by far the predominating method of forest management of modern Germany, though at the present moment there is considerable agitation in favor of a return to the methods of natural regeneration originally devised by the Germans and extensively developed in France. However, as far as actual practice goes, the clear cutting and planting system is virtually the only method used for conifers. Out of over two hundred coniferous forests I saw but three that were by natural regeneration, and in these the trees were crooked and the thinnings commercially valueless except for cord wood. In the deciduous forests of the upper Rhine and Westphalia, natural regeneration was of course used, owing to the fact that the root diffusion of these species makes their planting expense higher than with any form of seeding.

In spite of the tendency of some of our best-known authorities to belittle the achievements of the French foresters, I feel sure that a later and more comprehensive judgment will bring a universal acknowledgment that the world owes much to France's contributions to the practice of silviculture and that America in particular will find a great deal that is adaptable to our forest management. Two years ago I undertook an extensive course in French forest practice under the guidance of Prof. R. Hickel, of Versailles (whose latest book *Semis et Plantules* well deserves a translation into English), visited a number of French For-

ests, both standard and coppice, and became thoroughly conversant with what may be termed the French forest specialties.

France has made her most striking successes on a large scale with the following silvicultural operations:—Standard forest with natural regeneration by seeding cuts; standard coppice with balivage regeneration; reforesting mountain slopes; reforesting waste heather lands; arresting sand dune invasions. All these have been successfully done on a tremendous scale by the foresters of France and the technique thus developed must be considered as her contribution to the world's practice of forestry. In this article my aim will be to merely sketch these operations in order to give the reader a general idea of them in the brief space available.

STANDARD FOREST

A glance at the forest map of France herewith will show the immense preponderance of deciduous species, the oaks (five species), beech, hornbeam, ash, elm; and then, in the mountains of the Vosges, Jura, Provençal Alps and Pyrennees, fir and beech, spruce, and Austrian pine. Sylvester pine occupies the newly reforested Landes, the garrigues and all sandy basins too poor to grow hard woods, while maritime pine and Alep pine take up the south and west coasts. All the basin of the Seine is robur and peduncle oak, both coppice and high forest (Bellême, Berce, Sarce, Compiègne, Villepreu-las-Clayes, Champenoux, etc.); the North country is hornbeam and Brittany is beech. It is but logical, then, that the *futaie régulière* or standard forest, with regular regeneration, should have been developed on a great scale and even extended to the conifers, which are invariably planted in Germany.



Photo by Warren H. Miller.

THE FORESTERS TASK IN THE TERRES NOIRES.

The principles of natural regeneration are, first, the admission of sunlight to the forest floor in sufficient quantity to germinate the crop of seeds; second, the maintenance of a suitable shade over the seedlings resulting from a fall of seeds; and, finally, the removal of the last of the old stand. These operations are accomplished in practice as follows:—The forest is divided into as many cantons as the number of years of the revolution selected (70-120) and a seeding cut is made in one canton each year, cutting from east to west. The severity of the seeding cut is determined by the species and the first canton in the series is selected that has a seed year due that year. With the oaks enough trees are taken to leave the balance on 100 ft. centers; sylvester pine at the other extreme would be left on 200-250 ft. centers. The forester sees to it that these seed trees are all sound, healthy, and capable of shedding an abundant crop of acorns, beech-nuts, hornbeam, samaras or pine wing-seeds that fall (whatever may be the species),

and the following spring, since the forest floor is warm and sunlit, an abundant crop of seedlings comes up, which gives a thick fur of young trees of the same species as the original forest overhead. If not completely successful, a second crop of seeds is allowed to fall before proceeding to the secondary cut. This removes half of the seed trees, leaving enough protection to guard the young trees from sun-scorch and early frosts. Five years later they have grown so as to no longer require protection, and the terminal cut is then made which takes the last of the old stand. The reproduction is now complete and it has cost nothing beyond a slight increase in logging expense due to cutting over the same canton three times instead of once as would have been the case with clear cutting. But the cost of planting, not less than \$5 an acre, has been saved.

Continuing the régime of the Standard forest, the young growth is left to itself for about fifteen years after the terminal cut. It then receives its first

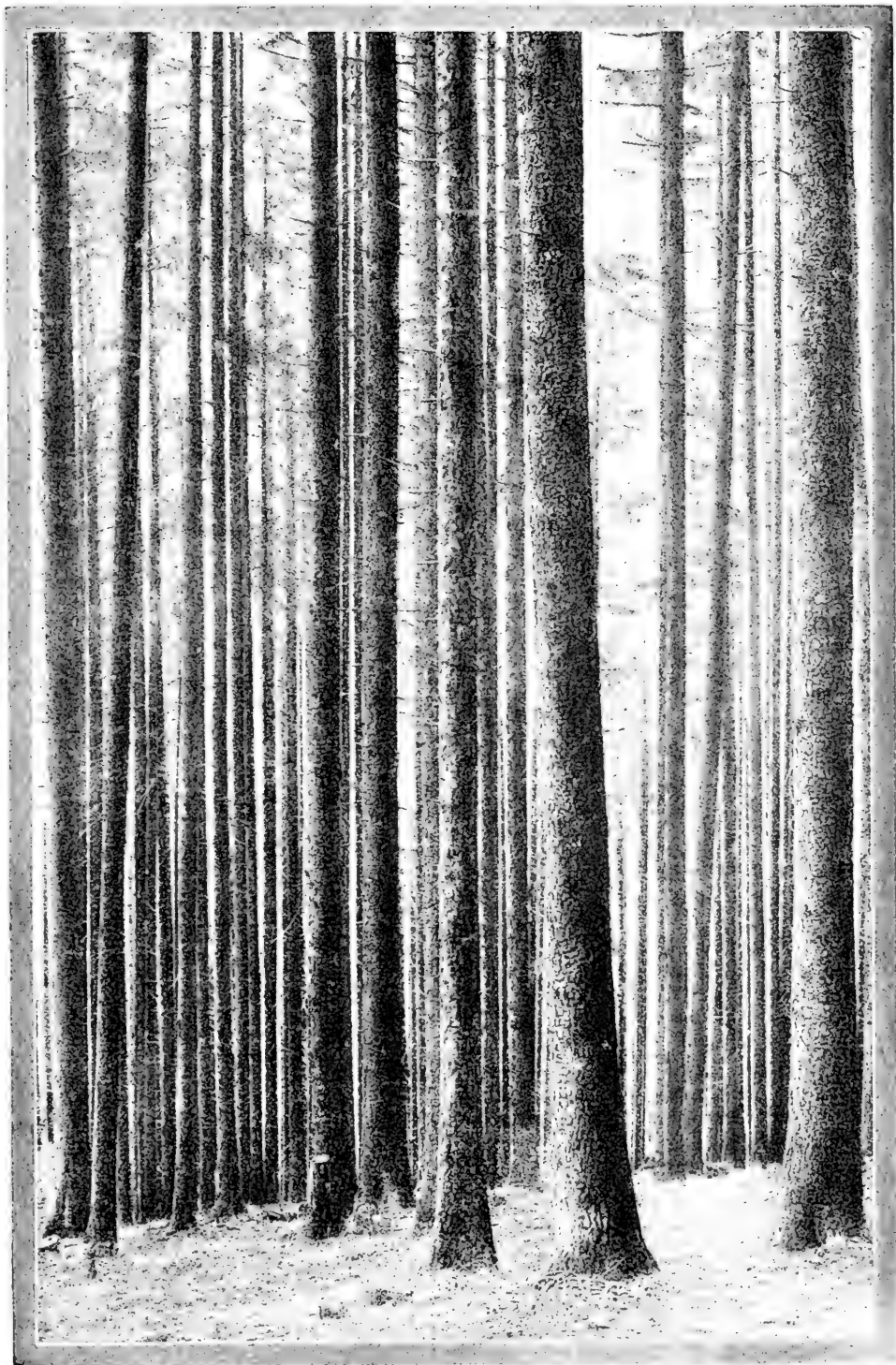
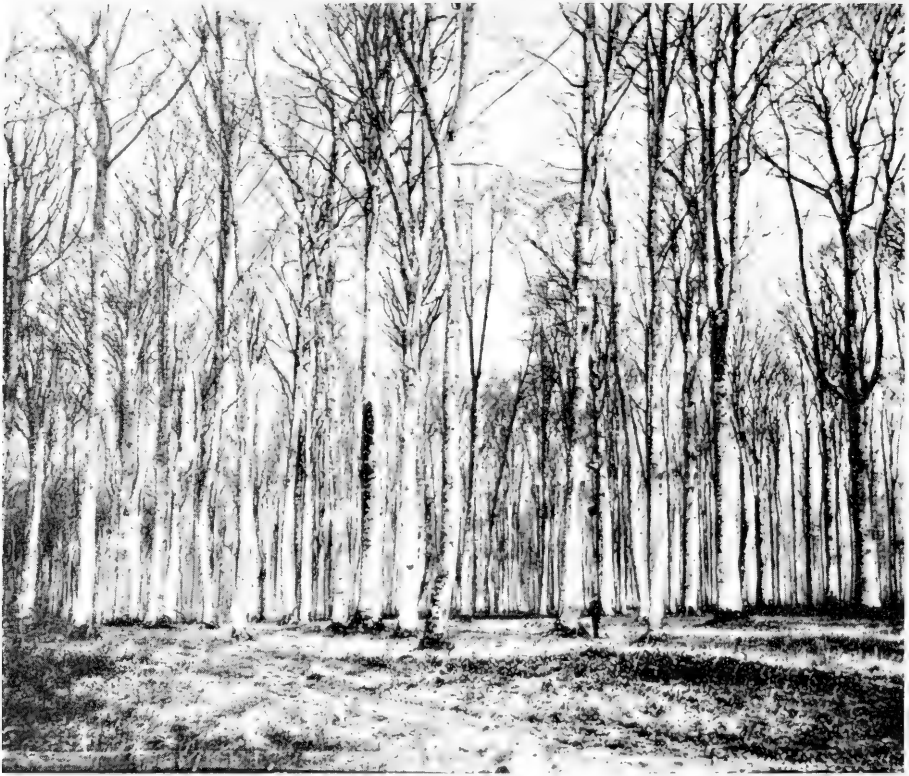


Photo by Warren H. Miller.

ONE HUNDRED YEAR FIRS IN THE VOSGES FOREST, 90,000 BOARD FEET PER ACRE.



PURE OAK FOREST, CANTON OF CLOS. *Photo by Warren H. Miller.*

thinning, taking out from one-half to two-thirds of the thick growth. Periodic thinnings follow at intervals of ten years, the general principle being to keep the tops of the dominant trees so that they will just meet when the next thinning comes due, and to keep enough of the sub-stage trees to protect the trunks of the first-class ones from the sun. None of these thinnings are wasted,—in fact nothing is ever wasted in France,—and the income from all classes of thinnings amounts to two-fifths of the market value of the final crop. The thicket-stage trimmings compete direct in the markets with coppice products, and the others furnish lumber of increasingly valuable sizes.

Arrived at the end of the revolution, which is at present taken at 60 years for sylvestre pine, 75 for oak, and 100 for fir, the seed cut is made in the nearest seed year for that canton (they occur every two to five years for most species) followed by the secondary cut,

and then the terminal cut when the new growth on the canton is established. In a French standard forest of an hundred cantons, each year sees one terminal cut, one secondary cut, one seedling cut and ten thinning cuts; in all thirteen cantons being cut over, so that there is plenty of business going on even though the cantons may be of only a few hectares area each.

As the system is one which we will adopt in America for nearly all forests not in close touch with rail facilities (such as replanted barrens and worn out pasturage), I will give here a few generalizations as to how to set about converting a wild American forest into a French Standard forest. The first desideratum is uniformity of species, wherefore when you cut cord wood from your woodlot or forest, replant the spot liberally with the species you have selected, preferably the dominant species already placed there by nature as survival of the fittest. The second

consideration is uniformity of age for the trees on each canton. A fifty-year American white oak is 12 to 13 inches in diameter, and at 75 years it will reach 19-20 inches, giving first-class new lumber. Having divided your forest into approximately equal areas as determined by the lay of water courses, ravines, logging roads, etc., arrange your thinning cuts and replantings so as to give you an unbroken series of ages year by year. If there are sufficient seed trees year by year on the spot, you can go direct to standard forest by making a seeding cut each year on each successive canton, eking out any bad spots with hand planting. Doing one canton each year you will have three cuts a year until the fifteenth year when your first thinning cuts begin. Any American hardwood forest can be thus converted into standard forest provided that enough seed trees are already on the sight. With conifers, I would advise underplanting for white pine or clear cut and replant with three-year nursery transplants for Scotch and Norway pine.

The French have developed coppice management to a science far in advance

of the other nations. In Italy, America and other coppice countries, simple coppice only is used, with no provision for future regeneration, but in France the predominating system, both in public and private coppice, is "standard coppice" with complete systems of "*baliveaux*," "*modernes*" and "*anciens*," as the seeding coppice trees are called.

This type of forest is based on the principle that certain species of trees, notably oak, chestnut, maple and ash have the property of sprouting from the stump, so that you have a forest of straight vertical branches without any trunks. As the root system is quite as large as with standard trees it is natural that the yield in branch wood is very large and sustained and the sprouts are straight enough to be valuable commercially. In twenty years a crop of four-inch shoots twenty feet long, six to ten to the stump, is available. All the shoots but one are taken, and in twenty years more a second crop has grown from the same stump. The sprout left from the first sprout is called a *baliveau* and serves not only for a future seed tree but for shade and protection to the young sprout. Left again



REFORESTING MOUNTAIN SLOPES.

Photo by Warren H. Miller.



SPRUCE FOREST IN THE JURA.

on the stump it is called a *moderne* and is 40 years old and about 8 inches in diameter. At the sixtieth year a third crop of sprouts is taken and the *moderne* becomes an *ancien* and bears seed abundantly. The *anciens* start a thick growth of seedlings all over the forest floor and after two more crops of sprouts the original stumps die but the seedlings have grown to 40-year trees, which are forthwith cut to stump and the *anciens* harvested, putting the forest in shape for coppice again. Horse chestnut coppice is usually managed in "simple coppice" with poplar balivage, that is, the whole crop of sprouts is taken every twenty years and the poplars held for shade.

The yield in poles, tan bark and lattice stock from coppice management is tremendous and the returns are quick, so that in Central France, where there is a ready market for cordwood, turning wood, tool handles and tan bark, coppice management is very extensive. It requires a rich clay soil as the roots feed excessively. If many of the stumps are allowed to produce *modernes* and *anciens* the sprout crop will suffer from shade, but more heavy timber will

be yielded so that in the judgment of the forester almost any yield desired for any particular market can be managed. In our own country native chestnut is the principal coppice crop, and telegraph poles, ties, and lumber for interior trim offers the best market, three or more shoots are allowed to grow to 10 and 12 inch poles per stump, yielding at the same time seed for regeneration.

REFORESTING MOUNTAIN SLOPES

The necessity for the hundreds of millions of francs that France has been forced to spend on this work had its beginnings in the orgy of unrestricted cutting which took place during the French Revolution and the Directory. Under the Bourbons the laws governing cuttings in private forests were severe and drastic, unnecessarily so, perhaps, so that, with the sweeping away of the monarchy and all its laws, all restraint was removed and an era of complete denudation of mountain forests set in. Furthermore, the herbage which sprang was given over to unrestricted pasturage so that neither seedlings nor bushes

nor even perennial weeds had a chance. The result was that over 9000 mountain streams in the Alps and the Pyrenees formerly steady in flow became raging torrents after every rain storm, the springs dried up, vegetation disappeared and the mountain slopes became mere arid sheds of detritus, loam and silt. Mountain real estate values shrivelled, the loss being something over three hundred billion francs and the flood and drouths in the low lands became an annual curse.

To date over three hundred million francs have been spent on reforestation and barrage and about 6000 torrential streams have been gotten under control. The procedure outlines as follows:—The first thing to do is to obstruct the flow in the torrent bed and reduce its velocity. A series of rough rock dams across the bed arrests this difficulty to form deposits of silt and mud. These *barrages*, so called, are planted with willow and alder shoots, forming living hedges which are carried far up the sides of the ravines. Next the mountain slopes are terraced by digging narrow horizontal ledges and planting seedlings in the banks formed by throwing the trench excavation down hill. The trenches are parallel and about 6 feet apart vertically. The species chosen depend almost exclusively upon maximum and minimum temperatures obtaining. In order of temperature—withstanding qualities they are: green oak, yew oak, pine Alep, Austrian pine, Cembro pine, from highest to lowest temperatures. The silt from the embankment above gradually fills the next trench below, but by the time the slope has been restored, the seedlings have formed an extensive root system and are able themselves to resist further erosion. As the plantation grows older it is managed strictly on the selection system. In the Terres Noires, where the soil base is black calcareous limestone, the case of complete soil denudation is exemplified, not even pasturage being left. In such cases the forester's first aim is to produce a thick covering of shrubs and weeds. All mountain slopes consist of a series of more or less vertical ravines with ridges or mountain backs in between. It is on these mountain backs that the



Photo by Warren H. Miller.

STANDARD COPPICE, CHAMPEROUX.

forester begins his first attack, for here the run-off is least severe. These slopes are planted with broom plant, Alpine heather, gorse and furze, which shrubs have been found to secure a foothold on dry, eroded soils more quickly and surely than any others.

RECLAMATION OF WASTE LANDS

The reclamation of the Landes of France constitutes another achievement of the French foresters which has added something like twenty million dollars to the land values of Southwestern France. Originally covered with forests, the denudation of the Landes in the 16th Century left nothing to take up the annual rainfall, so that without natural drainage the Landes soon degenerated into swampy moors, in which state they bid fair to remain indefinitely. However, at a cost of but 3 cents a square meter the French foresters reclaimed this entire area with a properly laid out system of drains. The sandy sections were planted in sylvester pine after several failures in maritime pine, and the better soils were sown with peduncle oak. The forest growth alone on the Landes is now estimated at over ten million dollars.

CONTROL OF SAND DUNES

The struggle of the French Foresters against the invasion of the sand dunes along the southwest coast resulted in developing an admirable system of dune control simple, logical and inexpensive. It was found that the only way to arrest sand invasion was at its source,—at the ocean shore line itself,—and it was also found that it was more difficult matter to make the ocean build its own dune. Once having built a dune forty to sixty feet above sea level, further sand invasion would cease and plants and vegetation could then be successfully grown upon the dune.

The method of procedure is as follows: At a calculated distance back from the beach a line of stakes is driven, carrying a woven willow screen from four to six feet high. In a short time the sand drifts has backed up and to the top of the screen making a long, gradual slope back to the shore. The stakes are then pulled up, advanced

some ten feet and the screen set up in the old drift. If the screen is six feet high a dune twelve feet high will have been formed by the time the sand has again backed up to the level of the top of the screen. The stakes are again pulled up, advanced and set up in the drift and the process is repeated until in the course of several years a dune thirty feet high has been created. At this stage the sand drift has retreated, almost ceasing and the character of the deposits in the dune changes. There is infinite room for further growth on the sea side, lichens and mosses, lenticulars, further drifts of sand, shrubs, vegetable growth and, beyond that, natural seeding of such trees and shrubs, and other forms of vegetation and the forest can be grown. The sand drifts, until he has a green stable dune where once were continuous moving drifts of sand, a tiny island and tiny, tiny, while forests in their seedings.

SAND DUNE CONTROL

For Dune Forests in French and British Colonies, Algeria, Egypt, Persia, Syria, etc., see the following: "The Dune Forests of Algeria," by J. B. de la Motte, in the "Revue Forestière de France," 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 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2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 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3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851



A ROAD ON THE PILA NATIONAL FOREST, PANAMA, WHICH COST \$1000 PER MILE

FOREST ROADS AND TRAILS

ERNEST W. HERRING

IN the past the construction of forest roads and trails was in the hands of individuals and private concerns and for that reason very little literature was published and only a small amount of data was collected. During the past few years the United States Forest Service has done a great deal of work in the development of the forests of the west, part of which consisted in building roads and trails. The development and protection of any forest region under forestry principles depends upon its accessibility, which means that roads or trails are necessary. Under the old methods of lumbering the land was devastated of its good timber or cut clean with no thought of the future, but now economic conditions have changed. The price of stumpage, the growing scarcity of standing timber and the common-sense conservation policies all demand better protection and closer utilization of the forest, and in order to attain this the woods must be opened up by roads and trails. The immense forest fires in the Northwest during the summer of

1910 indicate the great necessity of having the forest accessible.

The search for material for this article has extended over the entire country, but very little literature could be found. Valuable information has been taken from notes on Professor Chapman's lectures at Yale University and from W. E. Herring's lectures given at the State University of Washington. An attempt was made to collect specific examples of roads and trails which have been built in all the different forest regions of the United States, but it was impossible to obtain information from some of the regions.

USES OF TRAILS

Trails are for the use of the general public and of forest officers. The first trails in the present forests in different parts of the country were built mostly by miners, homesteaders, and stockmen. These trails were used entirely by the general public, and at that time the country was partially opened up and developed. The main object in build-



A FIRE LINE IN WISCONSIN, USED AS A ROAD.

ing these trails was accessibility. At present the main objects besides (1) accessibility, are, (2) administrative purposes, (3) routes for packing purposes (to mining camps, etc.), (4) pleasure (scenic trails), (5) fire lines, to a small extent, and (6) stock trails. The forest should be made accessible so that any part can be reached in a reasonable amount of time and routes of travel should be made for administration. Occasionally trails are built by private parties to provide a route for packing purposes, to remote mining camps. Scenic trails are built either by the State or by private parties, for both pleasure and accessibility. Trails are also used for fire lines, but due to their narrowness are not of great value for this purpose. Stock trails are built for moving stock over rough country from one range to another.

USES OF ROADS

The first roads constructed in the forest regions of the west were built for stage lines and for freighting purposes; logging had not been developed to any extent in the Rocky Mountains. At present the purposes of building roads are for (1) freighting, (2) logging, (3) stage lines, (4) pleasure, (5) fire lines. Freighting is a very impor-

tant item where camps and towns on a forest are located at a distance from the railroad. Where logging is going on in the Rocky Mountains, roads must be built on account of the extreme roughness of the country. Roads, because of their greater width, are well adapted for use as fire lines. In more level regions fire lines can be used as roads.

CONSTRUCTION OF TRAILS

Trails on the forest at present may be classified as: (1) main trails, (2) secondary trails, (3) spur trails. Main trails are those connecting ranger districts of the forest. They should be well worked, well brushed out and well blazed, and should have a fairly wide tread with a maximum grade of from ten to twelve per cent, for most of the traveling in the district will be on them. Secondary trails are those connecting the main trails. They should also be fairly well worked and blazed, and have a maximum grade of twelve to fifteen per cent. Spur trails are usually short trails connecting lookouts with the more important trails. These spur trails are used only by the fire guards and therefore it is not necessary to do a great deal of work on them. They can be blind trails and need only be brushed



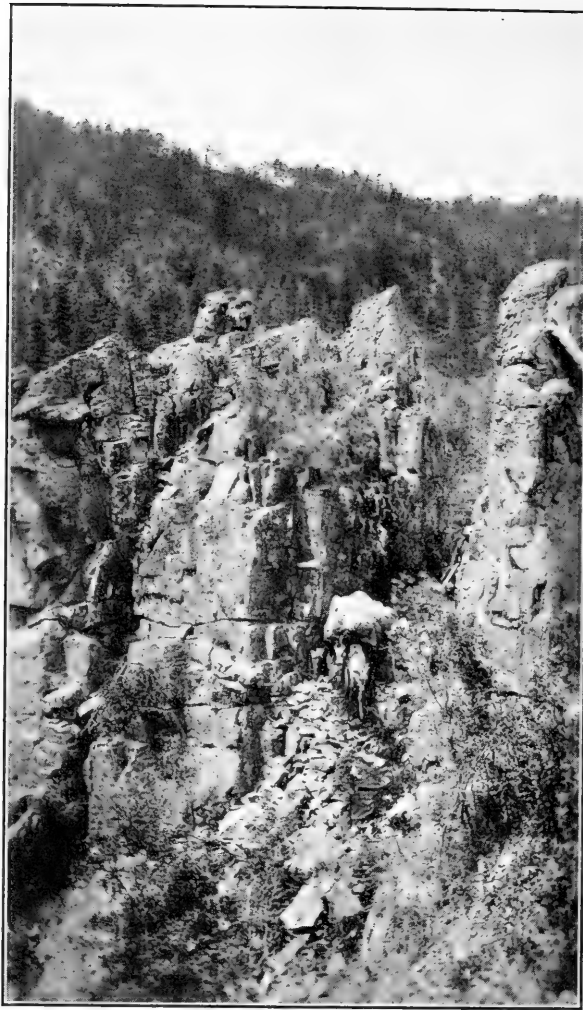
THE DECIDUOUS LEAVED FOREST IN THE BOTTOM OF A CANYON. THE LARGE TREES ARE ELM AND COTTONWOOD.

out enough so that a horse can get through with ease, which would mean a cleared space of four or five feet. A grade of fifteen to twenty per cent would be permissible.

The first and most important consideration in trail construction is always the location work. Grade is always the determining factor in location. Where it is steep, switchbacks should be resorted to. The methods used in location are, (1) compass and Abney hand level (accurate), (2) hand level only (fairly accurate) and (3) ocular leveling (inaccurate). A route should first be reconnoitered and definitely decided upon before it is staked out. The main points can be sketched in on a map by means of a compass and hand level. On short distances the hand level will be sufficient. Laying out by eye is a poor method and inaccurate at its best. The route should be staked every 50 to 100 feet and blazed, but as a usual thing routes are laid out by blazing only. The blazes should be made close together along the trail so that

there will never be any trouble in following them; a long blaze with a horizontal notch above is used on Forest Service trails. Location should always be from the top of a hill to the bottom, otherwise the maximum grade is apt to be exceeded, because in locating from the bottom there is danger of making the grade steeper than necessary. Location work can be done very well with a crew of three men and costs from \$2.00 to \$10.00 per mile.

There are several choices for trail routes, (1) valley or canyon, (2) ridge route, (3) trails crossing mountains, and (4) foothill grade. The use of one of the first two routes depends somewhat on the nature of the country. Where the canyons are extremely steep, narrow, and full of boxes or interrupted by cliffs, the ridges and sidehills can be followed without much trouble. Where sidehill routes are resorted to, the south sidehills should be used because they are passable three weeks earlier in spring and later in autumn than north hillsides. Where the country



TRAIL, BUILT AROUND A CANYON BOX BY PACKERS
OF GILA RECONNAISSANCE CREW, 1911.

has been worn down, the valleys have a gentle grade and are quite wide so that they make good trail routes. Where mountains are crossed the route is usually expensive and contains steep grades. The foothill grade is undesirable because there is so much winding in and out around the heads of canyons, in order to keep an even grade, that the trail is bound to be extremely long.

In the southwest, where cattle graze on the forests to some extent, it is found that they are very good engineers in the location of trails, as a number of trails on the Gila National Forest of New Mexico are old cattle trails which have been brushed out and blazed. In

going up a grade cattle resort to switchbacks and always travel where the going is best, keeping an even grade. In traveling down a ridge or canyon they always pick out the smooth spots and many of these trails located by cattle are just as good as those located by man.

The factors which influence the building and cost of trails are: (1) grade, (2) width of cleared space and the tread, (3) nature of the soil, (4) cost of labor, (5) distance for packing supplies, (6) distance men walk to work, (7) cost of supplies, and (8) supervision. Grade, as said before, is the determining factor of location; the steeper

the grade, the greater the length of the trail and consequently the greater the cost. The greater the amount of brush, the wider the space brushed out and the wider the tread the greater the cost. The cleared space varies from 6 to 14 feet, and the tread varies from 1 to 4 feet. Ordinarily a tread of 18 inches is wide enough, for a horse will almost invariably travel on the lower side of a trail and always in the same place, so if the trail is wider than 18 inches the inside will just fill up with sliding material and the extra cost in excavation will be thrown away. On turns, trails are widened and on switch backs the width is doubled. The trail bed should be flat. Excavation should be made into the bank instead of building up the lower side of the trail, because on steep slopes earth thrown out of the trail makes a poor footing. The nature of the soil affects the cost of excavation. The cost for excavation of sand would probably be the greatest, as the greatest amount of material would have to be taken out. The bank on the upper side of an excavation should slope away

from the trail, the angle differing with the nature of the soil, as follows:

Sand, angle of repose.	$23\frac{1}{2}^{\circ}$	or	43%
Earth, angle of repose.	33°	or	65%
Dry clay, angle of re-			
pose	----- 45°	or	100%

The greater the cost of labor the greater the cost of the trail to a certain extent. In some cases it is cheaper to hire a good crew and pay them good wages than to hire an inefficient crew at a low wage. The greater the distance the men walk to work the greater the cost of the trail, because even when the time of going to and from work is taken outside of the regular eight-hour day, which is usually the case, a large amount of walking and climbing before and after work will tire and worry the crew so that they will not be as efficient as otherwise. The supervision of the crew is the most important factor of all because, if the work is not arranged as it should be, the trail will be expensive under the most favorable conditions.



PINE CLAD SLOPES WITH CLIFF ABOVE.



A DENSE MIXED FOREST. A ROCKY LEDGE HIGH ABOVE THE BIRCHES, ASPENS AND PINES.

The size of the crews varies from 2 to 15 men. In crews of 8 to 15 men it is necessary to have a cook, a packer, and a foreman. The brushing out can be done by 2 to 4 men while 5 to 8 can do the grading. Small crews vary from 2 to 5 men. The men do their own cooking and a ranger has general supervision over the work. The tools ordinarily used are axes and brush hooks for brushing out; cant hooks and peavies for moving logs; shovels, picks, and mattocks for grading. Where small crews are at work and the slopes are not too steep the trail is brushed and blazed, and left in that condition for travel to cut out the tread. A method similar to this was followed in connection with the Gila reconnaissance work in New Mexico in the summer of 1911. The reconnaissance party was working in a fairly open country in which there were scarcely any trails. The packers were sent ahead to locate a route to the next camp and to blaze and brush out the trail to a width of about 4 feet. Then

when the pack outfit, which consisted of about 18 burros and 2 horses, went over this route it would be fairly well cut out so that with a little extra work a good trail could be built.

On side-hill locations where water will run down a trail, it is always best to put in water bars, that is, small ditches 2 inches to 4 inches deep running diagonally across the trail and banked on the lower side with earth or a small log sunk a few inches in the ground. These will turn the water and prevent any great amount of washing, which might ruin a trail. The number of water bars will vary with the grade of the trail and the degree of slope of the side hill on which the trail is located. It is much cheaper to put them in when building the trail than afterwards. Under ordinary conditions they can be located from 50 to 75 yards apart.

In locating a trail, cliffs and rocky outcrops should be avoided because powder work is very expensive. Occasionally when a trail affords so many advantages that a high cost is permis-



PINES SLOWLY INVADING THE GRASS FORMATION AT THE HEAD OF CANYONS. THE LIGHT AREAS ARE ROCK OUTCROPS.

sible a great deal of rock work can be done. The two materials used for blasting are dynamite, which costs from 10 to 15 cents per pound, and black powder, which is about the same price. Dynamite when exploded works instantaneously with a sharp shock, while black powder works slower and exerts more of a shoving force. The cost of rock work varies from \$.50 to \$1.50 per cubic yard.

In general in building trails the country should first be reconnoitered and the route fully decided upon. The trail should then be located by stakes or blazes and the route cleared and brushed out to the specified width. The grading work should then be done and the tread

made the specified width. Signs showing the distance from important points and from water should be put in every mile if possible and never less than every 4 or 5 miles.

ROAD CONSTRUCTION.

The use of a road largely determines the amount of work which should be done upon it. Freight roads and stage roads as a rule should be well worked and kept in good condition and if there is a great amount of traffic they should be double tracked or turn-outs made along the way, while for logging purposes it is not so necessary to have a well worked road, as it is only used



THE DOGBANE, A CONSPICUOUS PIONEER AFTER FOREST FIRES IN THIS LOCALITY.

temporarily, the road being abandoned as soon as the timber is cut. The maximum grade for the former road should be 7 per cent, but for a logging road, especially where all logs are hauled down hill, the maximum grade may be greater but should rarely exceed 12 per cent, and then only for short distances. Where roads are used for fire-lines, and fire protection is more important than traffic, the only work necessary is that of clearing the space.

The location of a road is more important than that of a trail, because the former demands a gentler gradient and requires a greater amount of money in its construction. Since grade is the determining factor in locating roads a transit should be used for that purpose, because of its accuracy. Heavy rock work and the construction of bridges should be avoided on account of the great expense. Side hills are the best for location since they are driest, have the best drainage and the best surface, and require less repairs, although the grading at the beginning will probably cost more. Routes of avalanches should be avoided, also routes in deep cuts, because the latter will fill up with snow. Switch-backs should not be used, for the sharp turns are not adapted to wagon traffic. The cost of location varies from \$5 to \$50 per mile.

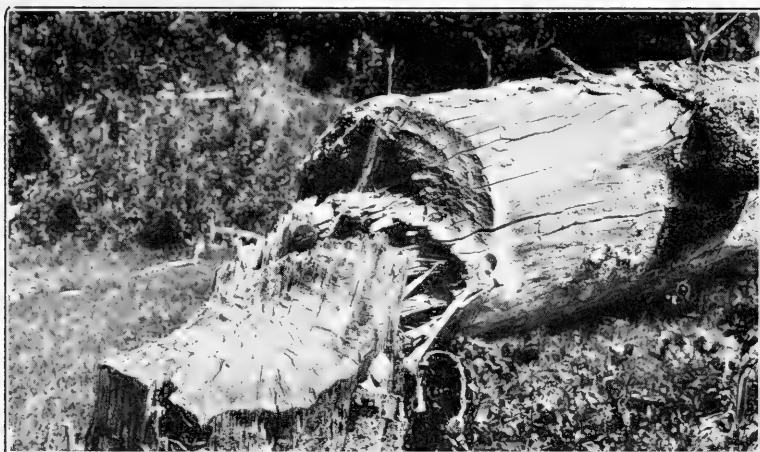
The factors which influence the cost of roads do not vary a great deal from those affecting trails. They are (1) grade, (2) width, (3) amount of brushing out, (4) amount of grading, (5) drainage, (6) rock work, (7) distance for hauling supplies, (8) cost of labor, and (9) supervision. The steeper the grade the greater the length of the road. As the maximum grade for most roads is from 6 to 7 per cent, a steep grade will greatly increase the length of the road. The width of the roads varies from 8 to 12 feet for single track roads and 16 to 20 feet for double track. The width of the road naturally affects the amount of brushing out. In heavily timbered localities the clearing is a very expensive item as it is difficult to remove the stumps and to roll the logs out of the way. The amount of grading is a factor which influences the cost,

depending on the steepness of the hillside and the number of stumps to be removed. A road should be so built that it is well drained; side ditches should be put in which have cross drains every 100 to 200 feet. In cheap roads the drains will not be covered, while in well-built roads, culverts or rocks or wood should be put in. Rock work cannot be avoided as readily in road as in trail construction and hence adds much to the expense. The supplies will be hauled by wagon, which costs only about one-third as much as by pack horses, hence the distance is not as important as in trail work. The cost of labor will affect road building the same as trail work. Supervision again is the most important factor of all.

In construction of roads, stumps and rocks should be removed by using powder or dynamite as it is much cheaper than by manual labor, because much time would be unnecessarily wasted in grubbing out stumps. All work possible should be done by teams, since hand grading in construction of roads is very expensive on account of the large amount of material to be removed. In building single-track roads, turn-outs should be built about 50 feet in length so that vehicles can pass each other. The length of the intervals between turn-outs would depend entirely upon the amount of travel expected on the road. In grading there should be more fills than cuts, because fills will drain better. In rock work the walls should slant away from the road so that debris will not be continually dropping down.

Drainage is an important item in road building. On level ground both sides should be ditched to a depth of about 1 foot and a width at the top from 2 to 3 feet. On hillsides the road should slope toward the hill with a ditch on the inner side. In swampy places a ditch 2 feet deep and 2 feet wide should be put on each side and a fairly high crown left in the center if possible.

A comparison of roads in general cannot be made because of the few examples and also because of the great variations in the use and construction of roads under different conditions.



A SAMPLE OF MANY COTTONWOODS SIXTEEN INCHES IN DIAMETER AND LARGER CUT BY BEAVERS.

Forest roads as a rule are single tracked and from 8 to 10 feet in width with a maximum grade of 6 to 7 per cent. The figures given by Mr. Greeley, of the United States Forest Service, for the cost of roads in District I, are from \$100.00 to \$1,000.00 per mile with an average cost of about \$500.00 per mile.

Just at present, trails are of much more importance to the United States forests than roads, because they are much cheaper and can be built in more inaccessible country. Very few roads have been built by the Forest Service, while a great many miles of trail have been constructed during the last few years. The great need of forests at present is an adequate fire protection, for which the trail will suffice, as far as the traveling over the country is

concerned. In 1910 an appropriation of \$600,000.00 was made for improvements, of which a considerable sum was used for roads and trails, as 2,225 miles of trails and 320 miles of roads were built. In 1911 this appropriation was cut down to \$275,000.00. Plans are now prepared for individual forests, which call for the building of over 30,000 miles of trail and 7,000 miles of road at an estimated cost of \$3,000,000.00. Several of the States have plans for road and trail construction, notably Wisconsin, Minnesota and a few of the eastern States. In the majority of States, however, forestry work does not include road and trail building.

*By courtesy of the Forest Club Annual, University of Nebraska.

OFF YEAR FOR APPLES

This is an off year for apples in New Jersey, according to the fruit growers and farmers. They say that the same trees that were so heavily laden with young fruit at this time last year that their boughs were bent almost to the breaking point are now almost bare of apples. There is no reason for the prospective shortage except that the blossoms failed to form this spring.

FOREST FIRES AND FORESTRY IN THE SOUTHERN STATES

BY HERMAN H. CHAPMAN

THE future timber supply of the Eastern States must come from one of two sources, either from the Pacific Coast by rail or water, or from home-grown timber. Pine or softwoods will continue to occupy the relatively important place they now hold, in the demand for lumber. It cannot be expected that the far West can ever supply lumber to the East even by the Panama Canal in sufficient quantities to wholly keep pace with the demand or at prices as low as the present rates on Southern yellow pine lumber. The problem of providing large future crops of pine in the East is an urgent one, and it is already certain that before such crops could grow to commercial size, practically all of the present stand of pine, both North and South, will be exhausted. The situation in the northern States is well known—the cut in the eastern portion is now largely spruce and hardwoods, while in the Lake States, hemlock and hardwoods are being cut that were worthless as long as pine remained. In Minnesota a fifteen to twenty years cut of pine remains for some mills but the total output is rapidly shrinking.

The alarming fact here is that throughout the northern pine region forest or brush fires have practically eliminated the prospects for a second crop, and completely destroyed all young pine timber. Efforts at reforestation so far have not assumed proportions that promise a future supply of commercial proportions—in fact, planting must in most cases be resorted to and there are not funds available to plant the millions of acres of devastated lands in need of restocking.

This disastrous condition arises from two causes—the susceptibility of northern pines, especially white pine, to destruction by fire, and the enormous fire hazard resulting from logging opera-

tions. It is not too late to solve this problem in a small way, for small areas, by brush piling, planting and forest reserves, but in these Northern States the big opportunity to secure natural reproduction over wide areas is forever lost.

This is not so in the South. Here we have an area originally pine land, much greater in extent than that occupied by northern pines. The soil varies from fertile clay loam through silt to grades of fine or coarse sand, sometimes underlaid by hard clay, elsewhere apparently very deep and holding little moisture.

Over this great area the logging and manufacture of southern yellow pine is almost at its height, although already the States on the eastern seaboard have been practically cut over for virgin pine.

The future of these pine lands of the South is the most urgent problem of eastern forestry today. Shall they be opened up for settlements or retained to grow more pine timber? These lands are practically all in private hands, and largely belong to firms whose business it is to run one or more large modern saw mills, and to earn if possible a fair rate of interest on the millions of capital invested in mills, equipment, lands and timber. Once cut over, these lands are seldom regarded as having any possible value as sources of another cut of lumber. Hence they must be sold as farm lands. There are and will be for a long period millions of acres of lands of this character in every Southern State—lands which have been until recently regarded by the natives as of little agricultural value. The old settlers farm the better classes of soil lying along the bottoms of the smaller streams not overflowed. In many districts more land has been abandoned after being farmed for varying periods than is now under cultivation.



GRANITE KNOB IN THE SOUTHERN APPALACHIAN MOUNTAINS FROM WHICH THE FOREST AND LATER THE SOIL HAS BEEN LARGELY REMOVED.

It is true that these pine soils are the poorest soils of the South, and that under the old systems of farming, with cotton as the principal crop, their fertility was rapidly lost. But with the development of agricultural experiment stations in the South and the increasing use of leguminous crops, better crop rotations, and truck and fruit farming, poorer soils are being used profitably and prosperous communities are springing up here and there dependent wholly on the agricultural use of these pine lands. Thus the whole question of the future growth of timber crops on southern pine lands is challenged at the outset on apparently valid grounds, and by the overwhelming interest of practically all elements of the communities affected.

It will be difficult for a long time to strike a proper balance between agricultural use and forest use of these southern lands. But one thing is certain; every agricultural community no

matter how fertile the soil, is better off if a certain per cent of the land is growing trees. Every farm is more valuable if it possesses a woodlot, and the poorer the soil the greater the per cent of the total area which can be devoted to tree growing, to the best interests of agriculture and of the community. In the South the areas of poor land are so vast and the quality of much of it so poor that we can hardly expect that a fifth part of it will ever be used for the more intensive crops like truck and small fruits. There are great tracts in New Jersey on the sand plains which are idle today in spite of their nearness to the enormous markets of New York and Philadelphia. Settlement on these southern pine soils proceeds slowly. Foreigners do not take kindly to the presence of the negro. Southern whites do not welcome the foreigner with open arms. Northern farmers do not tend to emigrate South as they are unused to the climate and

social conditions. All signs point to an increasing settlement and expansion of agriculture, but this process will be a gradual one and not a rush for land. From these facts two conclusions must be drawn.

First, there should probably be from 25 to 60% of the land in every pine district in the South, devoted permanently to growing timber, the more the farther the land is from markets and transportation and the poorer the soil. Second, much of the land that will ultimately be used for farming will not be so used for 15 to 20 years and under proper management much valuable timber could be grown on it in that time by proper cutting of present stands.

Who should be responsible for the future of the southern timber crops? Should the State governments acquire lands for forest reserves and raise timber? Whatever the merits of this plan, it will be difficult to carry out, because of the fact that the forest on these lands is not needed for protection of mountain slopes or to prevent erosion, and the State would use the land solely to grow timber. There would be opposition to State reserves both because of the doubt about the agricultural classification of such lands, and because of the expense attached to their acquisition and management, which Southern States are poorly equipped to meet.

Small areas might be so acquired to be used as demonstration forests for the encouragement of private owners.

But the future of the pine forests of this region will lie with their present owners, the lumberman and farmer, and State legislation should be shaped with this in view, to encourage owners to grow timber by giving them proper assistance in controlling fires, and by equitable taxation of growing timber.

There is a striking difference between southern and northern pine in their resistance to fire. White pine is killed easily by fires even when mature. But the three southern pines are all remarkably fire resistant and the longleaf pine has adapted its whole structure and growth as a seedling to the primary object of surviving ground fires. Probably not a single pine in the South has ever grown to maturity without having

survived repeated fires. Conditions in these States make fires almost inevitable. In spite of the abundant rainfall, the late spring and summer months are usually dry and fires burn readily. These fires are set carelessly or purposely to improve grazing which in most sections is getting steadily poorer in the woods.

The effect of these fires upon the forest has been deplored by foresters, and the tendency seems to be to try to pass laws modeled after those of Northern States, which seek to absolutely prevent fire in the forests and establish a system of fire wardens for this purpose. But it is more than probable that such a policy in the South would defeat its own ends and should never be attempted. It is the right policy for Northern States, where fires can and should be absolutely prevented. But there is abundant evidence that the attempt to keep fire entirely out of southern pine lands might finally result in complete destruction of the forests.

On longleaf soils, the pine needless form a very inflammable layer, which is supplemented by the growth of grass in open stands. In many districts, fire runs over these lands every year. In two or three years' time, if no fire occurs, there will be enough of an accumulation to make a very hot blaze, fatal to young seedlings in most cases. The risk gets worse as the period extends till at the end of ten to fifteen years, if fire is set in a dry time, the mature longleaf timber may be killed. This has actually occurred, though it is so seldom that fires have been kept out of such lands for more than a year or two, that such destruction is very rare.

In Shortleaf pine forests, fire is much less of a problem. The needles are small and accumulate slowly. There is more shade, less grass, and plenty of hardwood growth whose leaves do not burn with the heat and flame which distinguishes a grass or pine needle fire. Evidence from stumps of trees which have been burned into shows that fires occur in shortleaf at intervals of five to eight years, instead of every year or two, as in longleaf. Shortleaf seedlings are very easily destroyed by fire. But



DOE RIVER GORGE, TENN. THE FORESTS ON THE STEEP SLOPES OF THIS BEAUTIFUL GORGE HAVE ALMOST ALL BEEN CUT DOWN.

the young tree soon develops a thick bark and will resist small ground fires. In a region studied this spring in Southern Arkansas it was found that it took the average seedling only five years to reach a diameter of over an inch, and become fairly fire resistant, when growing in open places. Seedlings growing in the forest under partial shade grow more slowly and may be killed by fire at 8 or 10 years of age.

But the young trees which spring up on cut over areas would have plenty of sun and room and five years would

be enough to bring them to a fire resistant size.

On longleaf lands, the fires are at present so frequent that seedlings do not have time to get by the first two years when they are small and ill protected. If it were possible to keep fires out of an area for five years, these longleaf seedlings while still very short, —probably not over a foot high—would be an inch or more thick. None but a hot fire in dry weather could possibly kill them all at this stage. This frequency of fires is not a natural condi-



OLD VIRGIN FOREST REPLACING ITSELF WHERE FIRES HAVE BEEN ABSENT.



SKIDDING LONG LEAF PINE LOGS IN A LOUISIANA LUMBER CAMP.

Figure 1 illustrates the experimental design. It shows a sequence of events: a 'Stimulus' (a word) is presented, followed by a 'Response' (a button press). The response is then compared to a 'Target' (a word). If the response matches the target, a 'Correct' message is shown. If not, an 'Incorrect' message is shown. The diagram also indicates that the response is compared to the target and that the response is compared to the target.

Case	Age	Sex	Occupation	Onset	Duration	Location	Severity	Frequency	Associated symptoms	Diagnosis	Treatment	Outcome
1	25	Male	Student	2018/03/15	10 days	Head	Mild	1-2 times/day	Nausea, vomiting	Acute viral infection	Supportive care	Recovered
2	35	Female	Teacher	2018/04/01	15 days	Head	Moderate	3-4 times/day	Headache, fatigue	Acute viral infection	Supportive care	Recovered
3	45	Male	Engineer	2018/04/10	20 days	Head	Severe	5-6 times/day	Headache, fever, muscle pain	Acute viral infection	Supportive care	Recovered
4	55	Female	Homemaker	2018/04/20	25 days	Head	Mild	1-2 times/day	Nausea, vomiting	Acute viral infection	Supportive care	Recovered
5	65	Male	Retired	2018/05/01	30 days	Head	Moderate	3-4 times/day	Headache, fatigue	Acute viral infection	Supportive care	Recovered
6	75	Female	Homemaker	2018/05/10	35 days	Head	Severe	5-6 times/day	Headache, fever, muscle pain	Acute viral infection	Supportive care	Recovered
7	85	Male	Retired	2018/05/20	40 days	Head	Mild	1-2 times/day	Nausea, vomiting	Acute viral infection	Supportive care	Recovered
8	95	Female	Homemaker	2018/06/01	45 days	Head	Moderate	3-4 times/day	Headache, fatigue	Acute viral infection	Supportive care	Recovered
9	105	Male	Retired	2018/06/10	50 days	Head	Severe	5-6 times/day	Headache, fever, muscle pain	Acute viral infection	Supportive care	Recovered
10	115	Female	Homemaker	2018/06/20	55 days	Head	Mild	1-2 times/day	Nausea, vomiting	Acute viral infection	Supportive care	Recovered

the 1990s, the number of people in the world who are undernourished has declined from 1.1 billion to 800 million. The number of people who are malnourished has declined from 1.5 billion to 1 billion. The number of people who are obese has increased from 100 million to 300 million. The number of people who are overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million.

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The *Agrobacterium* strains were grown in YEA medium for 24 h at 28°C. The cell concentration of the strains was adjusted to 1.0 × 10⁸ cells/ml. The cell suspension was mixed with the plant tissue and incubated for 24 h at 28°C. The plant tissue was then cultured on the selective medium. The transformation efficiency was determined as the number of transformants per 100 mg of plant tissue. The data are the mean ± SD of three independent experiments.

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Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100

The fire scars which in time burn out and destroy old longleaf pine have usually been formed by fires burning in a dry season and in several years accumulated litter.

In the light of these facts it would be very questionable policy for Southern States by legislation to prohibit the burning of woods in attempt to prevent the use of fire. It would be far wiser for these States to establish State forestry departments with a technically trained man in charge, who can devote his entire time to educating and encouraging land owners to practise forestry by keeping their natural forest land in timber. An owner who desires to establish a protected area of the

kind above described should receive the support of the State in his efforts to keep our fire and protect reproduction of pine, which under proper conditions he is almost certain to get. But a gramicus enforcement of forest fire laws, borrowed whole from Northern States, and utterly unsuited to the South, will never result in anything but dissatisfaction and contempt on the part of practical men for forestry. A study of actual conditions and laws designed to meet these conditions is the only route by which the South will ever improve her wonderful opportunity to preserve her lumber industry for future generations.

ECONOMIC MATERIALS FOR BOAT AND BARGE CONSTRUCTION

By A. E. HAGENBACH, In charge of Docking Operations U. S. Engineer's Office, Rock Island, Ill.

OUR office has been collecting data on the cost of repairs of our standard barge, 19 ft. x 21 ft. x 4 ft. 7 in. for the past 6 years. As we are building the same size barge today, the cost of repairs will be directly comparable.

It has been found practical to frame and preserve the timbers in transit at a commercial treating plant, and then forward the timbers to the point of erection. By marking the pieces that cannot be easily identified, it is possible to assemble the barge quite rapidly.

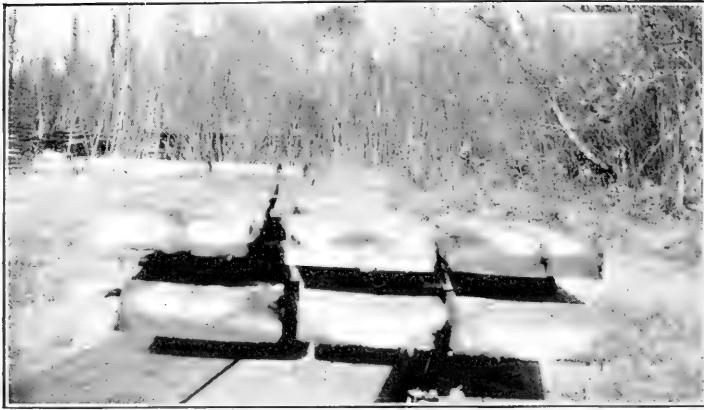
In the past five years I have examined a large number of untreated barges at various points on the river that have been in service from four to fifteen years. From these observations I would say that the decay always starts where there is an excess of moisture, together with the air and heat. In 90 per cent of the cases the decay starts in the ends of the timbers. That is to say, the decay develops in the same ratio as the wood absorbs moisture through the

ends. As a good pressure treatment will always plug the ends of the timbers, it is easy to understand why such good results have been obtained in the past with a pressure treatment of creosote or preservative oil.

In former years the opinion was held that it would not pay to preserve a barge because it would wear out before it decayed. This may be true under certain conditions, but as a general proposition I have found the lumber decays first, and when in this decayed condition is easily broken.

For barges used in fresh water it is not considered necessary to plug to the bottom, as it has been found that the bottom plank rarely decays. This fact can probably be attributed to the exclusion of air, as a barge usually contains 4 or 6 inches of water on the inside.

In constructing light draft barges it has been our policy to use the pressure preserved fir, as fir can be obtained in long lengths at a reasonable cost. Long timbers are especially desirable in barge



DECK PLAN REPLACED BECAUSE OF DECAY.

construction, as they reduce the number of gunwale joints to a minimum. The gunwale joints are always the first points to cause trouble by leaking, and so it is a big item to reduce these joints to a minimum. Besides being cheaper in cost, both before and after creosoting, the fir is lighter, resulting in a draft of but 9 inches for a standard barge 100 ft. x 20 ft. x 4 ft. 7 in.

White oak has been used almost exclusively in the past for the construction of model-shape steamboat hulls. The present tendency is to use steel. Cresoted timber is eliminated from consideration for model-type hulls on account of the necessity of framing and cutting timbers during erection, which would expose untreated surfaces if creosoted timbers were used. It is the opinion of the writer that the steel hull will give more economical results, for the reason that when the cost of repairs on an untreated oak hull during its life are added to the original cost, the yearly charge will closely approximate that of a steel hull.

These relations, however, do not exist in the case of "scow" pattern boats and barges. A steel barge will cost more than three times as much as an untreated fir barge, and nearly three times as much as a creosoted barge. The lumber for these "scow" pattern boats and barges can be advantageously framed and bored before treatment.

The first creosoted barges used in this country were built in 1900 of pressure treated yellow pine by the New Orleans Office of the U. S. Engineer Corps.

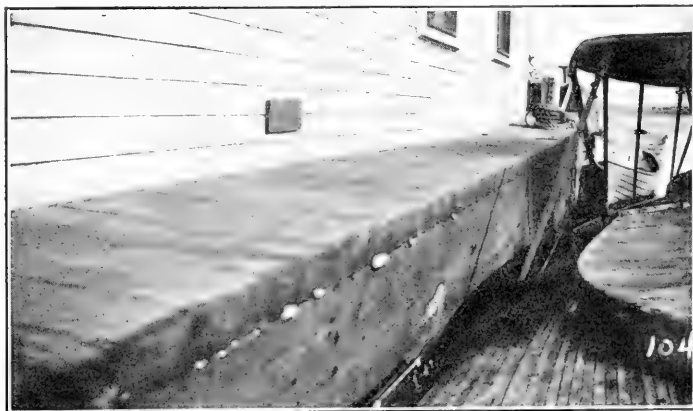
These barges are today in a perfect state of preservation, and in all probability will be used for 10 to 12 years longer. The cost of repairs has been light, and the results so satisfactory that no untreated barges are now built by that office.

The Rock Island District formerly used the open-tank treatment. The penetration was usually superficial, but the cost is only 5 per cent of the total cost of a fir barge. Last fall the writer inspected a large number of these fir barges built in 1908, and in no case was any evidence of decay found on the treated timbers, while in a number of cases the untreated timbers had reached an advanced stage of decay. It is, therefore, evident that the small cost of this treatment will pay good returns on the money invested. In the case of 90 per cent heart Long Leaf Pine the same conditions exist, as the penetration on the heart surfaces is usually superficial. With the Short Leaf and Loblolly Pine it has been our experience that this class of timber requires so much oil to saturate the sap that it often costs more than a 10-pound pressure treatment. For treating barge timbers the pressure treatment has, in the opinion of the writer, a number of advantages that make it a far more economical treatment. First, from a treating standpoint, it is possible to treat either green or seasoned lumber. Second, the exact quantity of oil injected can be ascertained by the temperature and gauge readings. Third, the entire treatment can be regulated

to meet the requirements of each particular charge. Fourth, it is possible to plug the ends of the timbers and thereby retard the absorption of moisture. Fifth, the penetration of oil is far more uniform. The last two factors tend to eliminate the so-called "working" of the timbers. This is an important item in barge construction, as it is a well-known fact that a barge built of green untreated lumber will usually cause trouble from leaking, due to the subsequent shrinkage of the timber as it dries, and the consequent opening of the seams and loosening of the oakum. Even after the lumber has once become dry it readily absorbs moisture during a wet period and again gives it up during a dry period, and as a result an untreated barge is re-calked every year after its fourth or fifth year in service. The pressure treatment has largely eliminated this re-calking, and so materially reduced the cost of repairs.

In conclusion I will state that the original cost of a steel barge with interest on the investment is not compensated for, by the added life, compared with a creosoted barge. That the cost of repairs on an untreated barge and its short life of real hard service makes the annual cost, including interest, 25 per cent more than for the pressure creosoted barge. That the pressure creosoted yellow pine barge and the pressure creosoted Douglas fir barge have respective fields depending upon the working conditions; on the Lower Mississippi, where there is always a good stage of water, the creosoted yellow pine will probably be more desirable, but for light draft and use on the upper Mississippi the pressure creosoted fir will be far more economical.

*By courtesy of the American Wood Preservers Association.



UNTREATED DOUGLAS FIR HULL FOUR YEARS OLD.

PLANTING NEW PINE TREES

Superintendent Eldridge, of the western division of the Florida Forest Reserve, is showing great activity and is securing good results. He will plant this season 800 pounds of Maritime pine seeds, a French species of the pine which the government thinks will serve as well for naval stores purposes as the Southern pitch pine. The start with this pine was made last year by planting 500 pounds of seed.

FIRE PROTECTION ON THE OZARK NATIONAL FOREST

BY FRANCIS KIEFER

Supervisor, Ozark National Forest, Arkansas

THE point in fire protection upon which the American forester lays greatest stress is the quick extinguishment of small fires and the consequent prevention of larger ones. In Arkansas, peculiar features in connection with topography, climate, vegetation, and local sentiment (more particularly the last) have increased the usual difficulties of fire protection, and, on the Ozark National Forest, have resulted in a unique solution of the problem.

Briefly, conditions in and near the Ozark National Forest are these: From central masses which divide the headwaters of the streams flowing north and east into the White River and those flowing south and west into the Arkansas, broken, round-topped hills radiate irregularly in all directions. Their altitude rarely exceeds 2,300 feet above the sea, or 1,800 feet above the lowest valleys.

Although the rock and boulder-strewn mountain sides are frequently broken by abrupt limestone cliffs, narrow benches occasionally attract the local farmer. On the rolling crests of the ridges, wherever the thin soil is at all productive, are scattered cornfields. In the narrow creek valleys the ribbons of alluvial fields stretch unbroken.

The Forest embraces many hardwoods of which white oak is the most prominent. Shortleaf pine is sprinkled on the south slopes, and is gradually strengthening its foothold. Trees of all ages and kinds grow in mixture—black oak, blackjack oak, post oak, black hickory, and pale leaf hickory, confining themselves to the drier, less fertile hilltops; white oak, red oak, shag bark and pig nut hickory, seeking the moister, deeper soils of the north and lower slopes. Groups of red cedar grow

on the bare, shallow limestone slopes and ledges. Reproduction of all these species is dense and thrifty wherever fires have been excluded. Sprouts, of course, are abundant, because fire, which is conducive to sprout growth, has been nearly everywhere.

The ground cover consists of sedge grass, lespedeza, and other range plants. Where fire is kept out for a year or two all of these are quickly smothered by the heavy floor of coarse oak leaves. Often burned areas support a sparse growth of sedge grass, wild pea vine, lespedeza, and other herb weeds less valuable for forage, upon which the scattered cattle of the mountaineers depend for subsistence.

Every year the woods are burned over to improve the range. The people pattern the often described mountaineer of Kentucky and Tennessee. They lead a secluded existence in their valley and ridge-topped communities, depending upon the forest range and mast for fodder for their cattle and hogs. Undisturbed, they have for years burned over the woods and destroyed the underbrush and litter of hardwood leaves in order to encourage the growth of grass and herbs. It is this custom, firmly established, which has been the greatest obstacle in the way of efficient fire protection in Arkansas. Observations made on the Arkansas and Ozark Forests show that burning in the long run does not benefit the range, which at best is inferior, but that on the other hand tremendous injury results to tree growth through the total destruction of reproduction and basal scarring of the older timber.

With this fact established a vigorous educational campaign was undertaken against woods burning, which has been continued to the present time. The re-



SHOWS LOOKOUT TOWER ON McGOWAN'S POINT. THESE PICTURES SHOW THE NEED OF A HIGH TOWER ON THE OZARK NATIONAL FOREST, BECAUSE OF THE HIGH TREES SURROUNDING. THESE TREES THAT ARE NEAR WILL BE FELLED TO PREVENT DAMAGE BY REASON OF THEIR FALLING AGAINST IT IN A HEAVY WIND STORM. McGOWAN'S POINT, ARKANSAS.

sults, though slow, have been encouraging.

The system of fire protection first adopted was a riding patrol maintained during the fire season in the spring and fall. On the Ozark each of the six district rangers, with 160,000 acres to cover, was authorized to expend from \$150 to \$200 for the hire of mounted patrolmen as conditions might demand. The first year the mere presence of the Forest officers checked wholesale burning. By the second year, however, this influence waned, and burning was

carried on more vigorously than ever. The season (fall of 1909 and spring of 1910) was unusually dry and windy, and the Forest officers were unable to cope with the situation. But the very extent of the damage which resulted worked in favor of the Forest Service, for many of the settlers who suffered heavy fire losses in fences and buildings became strong supporters of an effective plan of fire control. At the same time the inefficiency of the riding patrol and fire-fighting methods was made clearly apparent. Their weakness

lay in the fact that persons who wished to burn the woods could watch the movements of the patrolmen and set fires during their absence. Thus several fires could be started and given the opportunity to spread past control before the patrolmen returned. This fully demonstrated the need for permanent lookout points from which fires could be accurately located immediately upon their appearance. The patrolmen, it is true, maintained an intermittent lookout in riding point to point, where tall trees had been trimmed and made climable by the insertion of telephone pole steps, but this was insufficient.

At this point, Mr. Adams, then Supervisor of the Arkansas National Forest, introduced his ingenious ideas in watch towers and fire-fighting apparatus. His success encouraged the adoption of a scheme of steel lookout towers. The system installed on the Ozark during the fall of 1911 includes seven 64-foot towers and 120 miles of telephone line. The towers, with square open platform, are placed upon the highest points of vantage with least obstructed view. Each tower is connected with the others by telephone, and is equipped with a special telephone instrument and dial range finder. The range finder, a German silver plate 1-16 of an inch thick and 10 inches square, inscribed with a compass circle, is securely mounted on the apex of the four posts of the tower in the center of the platform, at a convenient height for the observer. In the center of the circle, swung on a pivot, is an arrow with sights. When the lookout discovers a smoke, he trains the sights on the fire and reads the bearing indicated by the arrow point. He then communicates by telephone with a neighboring tower and secures a cross bearing. With two bearings he is able to notify the district ranger of the exact position of the fire with reference to legal subdivision, topography, roads, etc. In this he is aided by the title map and protraction chart showing each tower with bearings projected for every five degrees. As a check the lookout makes a detailed report of his finding and action, and at stated intervals during the day reports by telephone to ranger headquarters.

The approximate average cost of a tower on the Ozark Forest is as follows:

Cost of tower f. o. b. factory-----	\$63.00
Telephone instrument-----	24.00
Range finder-----	8.00
Tools, dynamite, and miscellaneous--	5.00
Freight and hauling-----	25.00
Labor -----	25.00

Total -----\$150.00

Description of tower:

Weight-----	1,440 pounds
Height-----	64 feet
Platform-----	5'x5'
Capacity-----	5 persons
Safe load-----	16,000 pounds
Depth of anchor plates-----	5 feet
Spread between posts at ground-----	12 feet

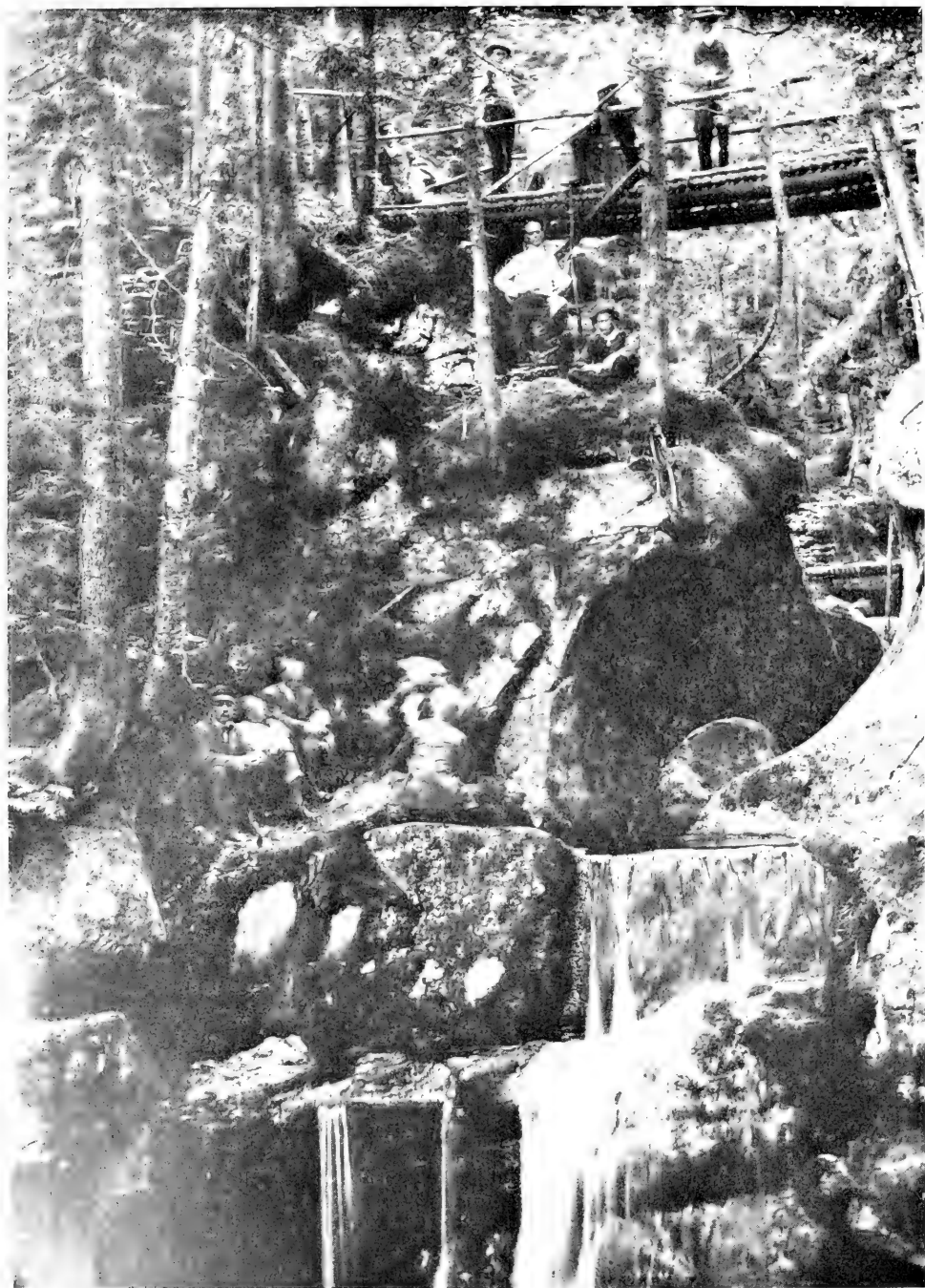
As soon as a fire is reported by a lookout the district ranger takes steps to extinguish it. Each ranger district is subdivided, as streams and roads dictate, into fire-fighting units, in each of which a reliable settler is designated as "selected fire-fighter" and supplied with complete fire-fighting equipment, consisting of potato rakes, wooden brooms, canvas sprinkling buckets, and pack bags. He has also a title and topographic map of his unit which enables him quickly and intelligently to plan his action. As a rule each "selected fire-fighter" is connected indirectly to the ranger station and lookout tower by a neighborhood telephone line. When a line of communication is lacking the "selected fire-fighter" is reached by a mounted messenger.

As soon as a fire is reported to a ranger he notifies the proper "selected fire-fighter" to hasten immediately to the blaze with such tools and extra help as he may need. Should the ranger in the course of his duties be out of touch with the lookout tower, the man in charge of the tower directs the "selected fire-fighter."

This simple organization has worked successfully wherever reliable men to serve as fire-fighters can be found and a good telephone line exists. Fires are discovered in their beginning and extinguished while they are still small. The value of a tower itself lies in the fact that it gives a stable and protected support to the range finder and elevates the lookout above the surrounding brush and timber.



GOV. BASS AND DIRECTORS OF AMERICAN FORESTRY ASSOCIATION ARRIVING AT LOST RIVER CABIN



DIP THE AMERICAN FORESTRY ASSOCIATION ALONG THE COURSE OF THE PICTURESQUE LOST RIVER.

IN THE WHITE MOUNTAINS

ONE of the most important actions taken by the directors of the American Forestry Association, who held their midsummer quarterly meeting in the White Mountains on July 17, 18 and 19, was the passage of a resolution protesting vigorously against the proposed amendment to the Agricultural Appropriation Bill, soon to be acted upon by the Senate, which provides that all lands in the national forests, "suitable and fit" for agriculture, must be classified and listed for settlement whether it is wise or unwise to remove them from public control. This resolution has been sent to each member of the Senate with a request for his careful attention.

The directors, with a number of guests, including State foresters, forestry instructors, State officials, timberland owners, paper and pulp company officials and a number of other prominent men, gathered at Plymouth, N. H., on the morning of July 17 and, through arrangements by Col. W. R. Brown, of the Berlin Mills Company, journeyed to North Woodstock in automobiles. The afternoon was spent in looking over the Lost River reserve, recently acquired by the Society for the Protection of New Hampshire Forests, and the members of the party climbed down the course of the Lost River for some distance among the mammoth boulders, into the caves they form, and viewed the remarkable scenic effects caused by some remote convulsion of nature, with wonder and delight. Here is a spot, which, when the road to it is improved, will become the mecca of almost every sight-seeing party going into the White Mountains.

There followed in the evening, at the Deer Park Hotel, a meeting participated in by the directors of the Association, and under the auspices of the Society for the Protection of the New Hampshire Forests. Some three hundred deeply interested people attended, many of them of national prominence.

They included Mrs. Grover Cleveland, Governor Robert P. Bass of New Hampshire, the president of the American Forestry Association, who opened the meeting with words of welcome; former Governor F. W. Rollins, who presided; former Governor Quimby of New Hampshire, former Governor Woodruff of Connecticut; President John H. Finley of the College of the City of New York; President Henry S. Drinker of Lehigh University, and—as ex-Governor Rollins said—"so many distinguished people that you could not turn around without bumping into one of them."

W. R. Brown, president of the New Hampshire Forestry Commission, told about the progress of forestry in New Hampshire during the year, his address appearing on another page; a paper by Montgomery Rollins, on the acquisition of Lost River, was read; E. E. Woodbury, an orator of North Woodstock, told of the towns interested in the Lost River, and there were talks by Dr. Finley, ex-Governors Quimby and Woodruff, Dr. Drinker, Dr. B. E. Fernow of Toronto, P. S. Ridsdale, executive secretary of the American Forestry Association, and others.

The following day the entire party journeyed by automobile to Bretton Woods where Thursday and Friday were spent in viewing the Crawford Notch reserves, and at several important meetings discussing forest problems and conditions of the day. The directors of the American Forestry Association held their sessions at the Mt. Washington Hotel and the other meetings were at the Mount Pleasant and the Crawford House.

Reports of the condition of the Association were most satisfactory and showed that the membership is steadily growing, that the sphere of its influence is rapidly extending, and that it is now regarded as one of the most important organizations, for the good of the general public, in the country, and as such

is receiving steadily increasing support and recognition.

At the fifth annual forestry conference meeting on the afternoon of July 18 there were represented the American Forestry Association, the Society for the Protection of New Hampshire Forests, the New Hampshire Timberland Owners' Association, and the Association of North Eastern Foresters. The fire protection problem was discussed at length, papers being read by Prof. J. H. Foster, of the New Hampshire State College; E. A. Ryder, Commissioner of the Department of Claims, Boston and Maine R. R.; State Forester E. C. Hirst, of New Hampshire; F. H. Billard, forester of the New Hampshire Timber Land Owners' Association; F. G. Olmstead, consulting forester of Boston; F. W. Rane, state forester of Massachusetts; S. N. Spring, state forester of Connecticut; Austin F. Hawes, state forester of Vermont, and Dr. B. E. Fernow, of Toronto.

In the evening H. S. Bristol, superintendent of Woodlands, for the Delaware and Hudson R. R. Co., spoke on problems of forestry as they relate to the railway; Prof. Walter Mulford, of Cornell, discussed the prospects of forestry as a profession; Prof. W. C. O'Kane, of the New Hampshire State College, spoke on the present status and prospects of the gypsy moth and the brown tail moth in the State; George H. Wirt, chief forest inspector of Pennsylvania, gave an illustrated lecture

on the management of State forests in Pennsylvania.

At the annual meeting of the Society for the Protection of New Hampshire Forests, held on the morning of July 19, reports were made on the gratifying progress of the society's work in the past year. In addition, Herbert Welsh, of Philadelphia, spoke about the progress upon the Sunapee Forest Reservation, and Harris A. Reynolds, Secretary of the Massachusetts Forestry Association, told how he is organizing branch associations in that State.

The ever interesting and vital question of the taxation of forests was discussed at the concluding meeting of the conference on Friday afternoon. Dr. B. E. Fernow spoke on the principles underlying the taxation of forests; Prof. F. R. Fairchild, of Yale, discussed the taxation of forests in America and abroad; and Prof. Charles J. Bullock, of Harvard, gave his ideas on practical plans for taxation in New Hampshire and Massachusetts. The other foresters and lumbermen present joined in the discussion, which, while it resulted in the enlightenment and instruction as to ways and means, of all who were present, did not reach any definite conclusion as to the best way to overcome existing difficulties.

In the evening, at the Crawford House, Philip W. Ayres, forester of the Society for the Protection of New Hampshire Forests, gave an illustrated address on the forests of the White Mountains.

MORE LAND FOR RESERVE

Washington, D. C.—The National Forest Reservation Commission has approved for purchase 55,000 acres in the Smoky Mountains of Tennessee and North Carolina. In addition, a tract of 24,900 acres, near the Natural Bridge, in Virginia, was approved for purchase. It is estimated that nearly \$2,000,000 was expended in connection with the acquisition of lands under the provisions of the Weeks law during the fiscal year which ended June 30, 1912.

OUR NATIONAL TIMBERLANDS THREATENED

BY HERMAN H. CHAPMAN

LEGISLATION pending in the present Congress, and which may be consummated at any day, threatens to take from the National Forests of the West, millions of acres of the most valuable timberland remaining in government control, and turn it over to the large lumber companies through the agency of the homestead laws.

In the agricultural appropriation act, which is now in final conference, the clause was introduced by Senator Nelson, providing that all lands "suitable and fit" for agriculture must be classified and listed for settlement at once under the homestead laws. This clause is intended by its author to apply to heavy bodies of timber. Under its operation all timber on the National Forest, which is growing on land for which any claim of agricultural value can be made must be listed, not when there is need of it for farming, but now, and by this listing be removed at once from the jurisdiction of Forest Service. Not a single safeguard is thrown around the operation of such a clause, and it would become necessary to list all lands of doubtful agricultural value, which might be claimed or desired for their timber under the guise of agricultural use. Claims are made that even steep mountain slopes are suitable for fruits and orchards and this would mean the immediate elimination of timber-covered slopes, because some of this land might some day be used for such purposes, and it is, therefore, all suitable and fit for agriculture.

There is hardly an acre of good timber land in the West to which claim would not be made under this proposed law, and if pushed to its logical conclusion the nation would be stripped of its remaining timber resources for the ultimate enrichment of the large lumber men, and an incidental and temporary benefit to those through whose

hands the timber passed en route to its ultimate ownership.

The opposition of the friends of true conservation secured a change in the wording of this amendment, while it was in the hands of the Conference Committee, and it now reads that all lands that are "chiefly valuable for agricultural purposes and that are not needed for public purposes, or for use by the public," must be listed immediately. This would prevent the listing of timbered land, and would prevent applications for water-power sites and for government ranger stations, which, under the original clause, could have been demanded as agricultural lands. The adoption of this modified amendment has met with bitter opposition on the floor of the Senate and the advocates of the original timber grabbing amendment threatened to filibuster against the bill and prevent the passage of the appropriations for the Forest Service unless they are permitted to have their way.

When these forests were created they were supposed to include lands more valuable for their timber or for the protection of water sheds than for agriculture, and to exclude lands chiefly valuable for agriculture. It was impossible to avoid including some lands within the original boundaries, which were agricultural in character, but as fast as the work could be done close examinations were made of all forests and the boundaries were readjusted to exclude all large bodies of lands, not heavily covered with valuable timber, which could be used for agriculture. This work has been completed for over a year, but to supplement this classification and make sure that there remain no land genuinely desired and suitable for farming, a law was passed June 11, 1906, permitting persons to apply for any lands within the National Forests for homesteads. If, on examina-

tion by the Forest Officers, these lands prove to be agricultural and not more valuable for their timber than for farming, they were listed for settlement. In this way practically all lands of enough possible agricultural value to induce some one to apply for them, have been or will be listed and eliminated from the forests, except those lands which are covered by heavy stands of timber on a soil which would be agricultural, if cleared. The liberality of the Forest Service in listing lands has gone even beyond the points of the limits of wisdom, for in some cases on National Forests, from twenty to forty per cent of the lands listed on application of would-be homesteaders are not even filed upon, but remain vacant, and the number of claims which are proved up will fall far short of those listed.

There remains the heavily timbered lands with good soil. Under the operations of the old land laws, all such lands were eagerly sought by claimants who proved upon them as homesteads or secured them under the Stone and Timber acts. Few of these claimants had the slightest intentions of retaining these lands for homes and they sold them to lumber companies at low prices as soon as they obtained title. In this way the large holding of the Western Lumber men were built up.

To prevent a repetition of this process to secure the true aims of the law and encourage bona fide settlers and not timber land grabbers, the Forest Service has been obliged to report adversely on hundreds of applications for timber lands under the homestead provisions

under the act of June 11, 1906. On the other hand the service attempts to encourage the sale of timber from these lands as rapidly as possible. When the timber is sold and cut the lands are listed for settlement and none but the genuine homesteaders ever apply.

If such lands should fall into the hands of lumber companies who already own vast areas, the chances are that they will not be logged for many years. After removing the timber the companies will endeavor to sell these lands to settlers who will thus be under the handicap of paying for the land as well as clearing it for farming. The policy of the service tends to concentrate lumbering and sales on agricultural lands and is the surest method of hastening the settlement of such lands. It is evident that under the present law agricultural development is stimulated and not delayed.

The situation calls for immediate action on the part of those who desire the true development of the West and are opposed to the old wasteful policy of the past. The specious arguments which are cited to justify this timber grab break down in the light of those facts. If the nation is to have timber in the future, it must come largely from lands owned by the Nation and the people. If inroads upon these timber lands are allowed to go on unchecked in the interest of private greed, it will not be a decade before the National Forests will be reduced to barren rocks and snowy mountain tops, which now compose more than half their total area.

SHOOTING IN BURMA*

BY A. J. BUTTERWICK, *E. A. C. Forests*

IN the beginning of this year I was instructed to go and do markings in the Mahuya and Paunglin Reserves, which lie on the eastern slopes of the Pegu Yomas, and in which the two chaungs, the Paunglin and Mahuya, take their rise, and uniting, eventually form what is commonly known in Burma as the Pazundaung creek. When I arrived at my destination, the villagers round

about came and gave me thrilling accounts of the many tigers and elephants which roamed about the surrounding forests. As the latter class of animals may not be shot except under certain conditions, and as I had never shot a tiger and was very anxious to do so, I gave all my spare attention to the former class. I tried again and again to purchase a buffalo or cow-calf to put

out as a bait, but the villagers refused to sell me even one. I was thus forced to rely on the chance of finding a kill of a wild animal in the forests. I was rather lucky in this, as about three weeks after I had arrived, one of my men one morning came upon the body of a sambur stag which had been killed by a tiger on the previous day. In the course of the day I had my *machān* erected on a conveniently situated tree and at about 4.30 P. M. I started off the kill, accompanied by two Burmans. When I arrived there, to my great surprise I came face to face with the tiger having its meal. However, before I could get a shot stripes was off. I felt inclined to return to my camp, thinking that the beast would not come back that evening, but acting on the advice of my Burmans, I changed my mind and went to the *machān* followed by my men. We had hardly been seated for half an hour, when I saw the huge cat coming stealthily along towards the kill, taking cover most carefully for about four or five seconds behind every bush it came across. As it approached nearer and nearer to the kill, I gradually brought my rifle up to the present, and as soon as it came into the open near the carcass, I aimed for its heart and fired. As soon as I had done so, the beast gave a wild jump, let out a loud roar and rolled over. At first I thought it was dead, but after a short time it got up and disappeared from sight into the thick undergrowth. As it was getting dark by then I decided not to follow up the wounded animal, but returned to camp as soon as possible. The next morning, accompanied by almost all the villagers who having heard of the affair had early flocked to my tent, I went in search of the tiger. When we came to the site to my great astonishment I found that the kill had been dragged during the night. This could mean either I had not mortally wounded the tiger or else there was another animal feeding on the kill. The first supposition was soon dispelled, for we soon after struck the trail of blood and found stripes lying cold and stiff in a chaung close by. It was a tigress I had shot, and it measured 8 feet 6 inches. The bullet had gone clean through its body, and it must have died shortly after we

had quitted the *machān* the evening before. The Burmans and Karens then told me that its pair must be the animal which had dragged the kill during the night. I immediately had another *machān* erected and went off to work. I went out to the kill that evening at about 3.30 P. M., but when I arrived there I found that the body had been dragged again by the beast during the day. To enable me to see the carcass clearly from the *machān*, I had the place around it slightly cleared, but whether this cutting frightened the animal or not, nothing turned up that evening, although I sat up till it was too dark to see. The tiger, or whatever it was, came, however, the same night and dragged away the kill again. I had another *machān* erected near the new spot and sat up again that evening. When it was almost dusk, to my great surprise, instead of a tiger a huge black bear shambled out from the undergrowth and started eating at the carcass. I soon settled him with a shot through his breast. I then naturally concluded, that it must have been the bear that had dragged the body of the deer the day before. But the Burmans and Karens would have it that it was a tiger and even showed me fresh pug marks of the huge cat. They also solemnly stated that the tiger had not come because it was afraid of the bear, and that it would come again now that the latter was dead. I may here state that when I was skinning this animal the villagers were very keen on getting hold of a part of the intestine they called the *the-gay*. I do not know exactly what organ of the bear's body it is, but it was considered very valuable as a medicine by the people, and one villager even offered me Rs. 5 for it. He was greatly surprised when I declined to sell it to him, but gave it away *gratis* to the man who had helped me most in the shoot. Well, to revert again to the kill, I found the next morning that it had been dragged yet again, and I was thoroughly astonished. In the evening I sat up again on a newly-made *machān*, but it was in vain, as nothing appeared. The next evening, however, I was more fortunate, but again, instead of the expected tiger, another black bear came to the kill, and I easily disposed of him.

NEW HAMPSHIRE STATE WORK*

BY W. R. BROWN

IT is a great privilege and pleasure for the State of New Hampshire to receive a visit from the Directors of the American Forestry Association and to extend to you and your guests, not the keys of the City in this case, but the open door of this, our beautiful State. We are particularly glad to welcome you, and it is especially appropriate that you come to us just at this time, to help us take stock of our recently acquired land reservations; and while we felicitate ourselves on the happy termination of the event, we are not unmindful that a large share of our thanks is due to you for the aid and assistance which you have so generously given us, in our endeavor to have these Federal, State and private reservations established among the White Mountains.

While earnest endeavors towards conservation are being here crystallized into a tangible fact; while this land is about to be purchased and administered, I must not fail to bring to your attention also the considerable responsibilities which it involves, and that the administration of this property wisely, will have a great effect upon the common acceptance which is given to the practice of forestry. Both the immediate and potential good to be derived must be clearly shown, for it must not be forgotten that the State is losing a considerable income from taxation in the passing over of these lands.

I have been asked to give a short account of State work and will therefore take up the administration of State land first. For the first time in this country the usefulness of preserving timber for the protection of stream flow has been actually demonstrated by the Geological Department, and the maintenance of a thick cover upon the headquarters of the streams should be aimed for. This

will probably necessitate a certain amount of planting on the waste and cut-over areas, and the conservative cutting of the tracts containing mature trees. It will also carry with it eternal vigilance against the spread of any fire, and call for careful observation and supervision of the general public, who will make use of it in the way of a public park. As much income as is compatible with the essential preservation of stream flow and park purposes, should be derived from the cutting of the mature trees in order to help pay the necessary expense of supervision and restocking. It is extremely doubtful if there will be anything but a debit balance for the first few years in the administration of the present State lands, but it is not unreasonable to prophecy that in the case of the Federal Reserves in the end, they will prove extremely valuable to the Government and yield a handsome income over and above the cost of maintenance. Particularly will New England profit by the demonstration which can there be made of silvicultural practice of efficient methods of protection against fire. And to the Forest Service also the practical operation of logging methods designed to suit New England conditions will be of high educational value.

The reservations which have been taken over are as follows: Two belonging to the Association for the Protection of New Hampshire Forests, one of which is the Lost River Reservation, which you have seen, comprising 148 acres, and which it is proposed to maintain as a public park. This reservation was secured through a widespread subscription. The other one, the Sunapee Reservation, comprises 656 acres on Sunapee Mountain, and was acquired by those having places nearby and through the generosity of Herbert

Welsh. It contains much fine timber and will be preserved as a demonstration forest.

The Appalachian Mountain Club has eleven small reservations comprising 750 acres, acquired to preserve spots of especial beauty to the mountain climber.

Belonging to the State are three small reservations: Monadnock, on Monadnock Mountain, comprising 600 acres; Harriman Reservation in the town of Warner, comprising 200 acres; and Haven Reservation in the town of Jaffery, comprising 100 acres—all acquired by gift to the State. These tracts should be the nucleus of planted State lands, if sufficient appropriation can be had for this purpose. The State is also engaged in taking over by Legislative Act between five and six thousand acres of the upper end of Harts Location, which we shall have the pleasure of showing you from Bretton Woods, extending as far south as Bemis Brook just below the Frankenstein Cliff, and comprising the most picturesque part of Crawford Notch. A committee of three, appointed by the Supreme Court, is now sitting to hear testimony as to values and areas, to determine the price which will be paid the owners under condemnation proceedings. After the State has acquired this land the Forestry Commission proposes to make a working plan of the age and condition of the various species of trees found thereon, and report to the Governor and Council with recommendations as to the thinnings desirable in the different sections. To assist them in this it is proposed to secure the services of a landscape architect to determine if short vistas, giving a view of the lofty side cliffs, cannot be opened up on both sides of the carriage road at advantageous places without doing injury to the now almost complete shade. It is also proposed that a suitable tablet, showing it to be a State Reservation, might be properly placed upon the cliff face at the Northern entrance, and a gateway at the South end. Paths to exceptionally fine view points ought to be constructed, and such other suggestions as would make it an attractive place to visit should be carried out by means of

a liberal appropriation at the next legislature.

The Federal Government has already purchased three distinct areas; the first of about 7,000 acres, comprising the westerly slopes of Mt. Lafayette and Mt. Garfield, through which the State road dedicated to Mr. Anderson runs between the Profile House and Twin Mountain. This, although largely cut over for soft wood, is still coming up to a fine growth, and offers much future for the practice of forestry. The second, a 30,000-acre tract, starts from a point within a short distance of the Mt. Washington Hotel and takes in the whole of Cherry Mountain, the Dartmouth Range, and the Northern slopes of the Presidential Range as far as Gorham, and contains considerable areas of old growth timber, second growth cuttings and waste lands, and much of the finest scenery in the State. The third has an area of about 35,000 acres in the valley of Wild River, somewhat off from the tourist route, but particularly desirable for its protection of the stream flow and the coming up of much young growth.

While the Federal, State and Private forces are engaged in securing themselves in the possession of land, the towns and municipalities who possess the best opportunity for doing this, have not as yet recognized the great advantage which would return to them and to the State from the purchase of their waste lands. Many lands are thrown upon the towns for taxes and could be picked up at a small figure, and if this was done no one step would go farther towards solving the future timber supply of the State as a whole. The Forestry Commission cannot too strongly recommend the town and municipal ownership of a certain portion of the State and call this to the attention of all selectmen and mayors of all cities, both because they are in a splendid position to bond for this purpose, which, if rightly handled, should yield a net income over and above the interest on such bonds, and because the town in the course of time would thereby increase its value for taxation purposes, and meanwhile furnish a labor market close at hand for its citizens. A few

cord and Nashua, have acquired land, usually for the protection of reservoirs; ten thousand acres being the total owned by towns throughout the State.

STUDY OF CONDITIONS

The State Forester has printed and distributed a pamphlet on Forest Planting. In conjunction with the Forest Service he has completed a report on the woodworking industries of our State, which will shortly come from the press. He has completed five maps of the four fire districts into which the State is divided, for the use of the service. He has made a complete map of the railroads rights-of-way throughout the State, showing the character of the growth on each side in reference to the danger from ignition by sparks from locomotives. It is interesting to note that this map shows that only about half of the 1,085 miles of railroads within the State, or 456 miles, run through woodland, and has proved of much service in narrowing down and locating the points at which fire has and will most frequently occur, and shows the necessary points at which ditching outside could be most advantageously done.

The State Forester has given thirty lectures and five fair exhibitions. Together with the members of the Forestry Commission and Mr. F. H. Billard, Forester of the New Hampshire Timberland Owners' Association, nine warden conferences have been held, with an average attendance of fifteen, at which the laws were explained and the needs of the different sections discussed, and co-operation encouraged between neighboring towns. The services of the Boy Scouts of New Hampshire have been obtained through the offer by the Forestry Commission of two gold, three silver, and five bronze medals for assistance in the apprehension and extinguishment of fire, through such rules and regulations as have been found safe and practical in other parts of the country; the committee of award to be composed of the Governor, the Chief of the Boy Scouts, and the State Forester.

An organization for fire protection has been perfected with the active

co-operation of the towns and Timberland Land Owners' Association and the Federal Service, which comprises at the present time in total 24 mountain lookout stations with watchmen, 24 regular patrol routes and 50 temporary ones at times of extreme dry weather; the distribution of 30 tool boxes containing fire-fighting tools at inaccessible points; the construction of 60 miles of telephone line; the cutting out of 29 miles of trails; the making of 12 contour maps for the mountain lookout stations, and the appointment of 224 regular and 400 deputy fire wardens in the towns of the State.

A renewal of the Federal assistance under the Weeks law was obtained of \$8,000, an increase of \$800 over the amount obtained last year.

At the close of last year's fire season a little over one thousand fires had been reported on blanks furnished the fire wardens for this purpose, of which 133 were apprehended by mountain lookouts. The majority of these fires were extinguished in their incipiency, the few which got away burning over forty-two thousand acres. The wooded area of the State being reckoned at four million acres, the resulting burned area amounted to about 1%, if the land burned over was a fair average in value of the whole; this in a year which was decidedly unfavorable throughout the country. The proportionate area burned in the northern part of the State where the best patrol had been established was 7-10 of 1%, while the proportionate area in the southern part of the State was 1 3-10%, showing the efficiency directly attributable to additional patrol and watchfulness. Even with the fires confined to this small percentage of the area, the whole damage reported through the State was on this 1% of the total area, \$206,000. About \$38,000 was spent last year from all sources representing the State, the towns, the timberland owners and the Federal Government, or an insurance premium paid, we will say, of about 1-5 of 1%, so that we are led to believe that if a few thousand dollars more were spent in protection it would yield immense returns in the saving of even a portion of this \$206,000. Co-operation has been

established with the Boston & Maine Railroad during the year, leading to the appointment of Mr. E. A. Ryder at the head of a Fire Claims Department, and an agreement with the State Commission that if the crew section bosses in any towns are appointed State Deputy Fire Wardens, the railroad will take charge of all fires originating from their right-of-way, and reimburse the towns in which said fire occurs for all expense incurred in extinguishing the same. Also that all section crews will be instructed and equipped to handle fires occurring in their section; that all station agents will be instructed to post notices within stations and to actively assist in spreading alarm and securing aid and assistance in the case of fires, occurring on each side of their station; that fire signals from engines will be sounded, and that a commencement will be made towards cleaning up the slash and ditching outside of the right-of-way in dangerous places. Legislation calling for the permission and assistance of adjacent land owners in this most important work should be passed at the next Legislature. Two large mogul oil burning engines have been installed on the Maine Central Railroad to run up the heavy grade through the Crawford Notch, and it is particularly desired that this installation be extended to other branch roads throughout the State.

*An address delivered at North Woodstock, July 17, at the Fifth Annual Forest Conference.

A movement towards the protection of forests from over taxation has been started at the recent convention to amend the constitution of New Hampshire, and a bill passed to amend the equal and proportionate assessment of all property for the purpose of taxation and to allow a special classification of timberland. This will enable the coming Legislature to act if it is so disposed to do. The various methods under which this could be done will be discussed at a special meeting Friday morning at the Mt. Pleasant Hotel.

The Commission regrets that it was not possible for the party to go by the way of Boscowen where the State has now some three hundred thousand transplants of White, Red and Scotch Pine, Norway Spruce, Balsam Fir, Red Oak, Chestnut and Basswood under cultivation preparatory to selling them during the coming season. The nursery distributed two hundred thousand trees during the past year, principally for planting on farms.

On the run to-morrow to Bretton Woods a few of the reservations spoken of above can be seen by the party, and some of the mountains on which lookout stations have been established, and the Commission joins with the Association in hoping that the weather, the road and the automobiles for the run be equally settled and propitious for your pleasure.

July 17, at the Fifth Annual Forest Conference.

RURAL MAIL PATROL

By J. G. PETERS, *Forest Service*

THROUGH the co-operation of the Post Office Department a special order has been issued to postmasters in practically all the National Forests and in the States which have established fire protective systems to instruct rural mail carriers to report forest fires. For several years in some of the National Forests there has been informal co-operation of this nature between the rangers and mail carriers, and its effectiveness in securing increased protection has been clearly demonstrated. Now, all national and State

forest officers who have requested assistance of this kind may receive it.

The plan is for the carrier to report a fire to the nearest forest officer on his route; or, if no officer lives on the route, to have him notified by some responsible citizen. The State Foresters and National District Foresters are supplied with post maps showing the routes traversed and with Postal Guides containing the addresses of the different postmasters, who are, in turn, supplied by the Foresters with the names, addresses, and telephone call numbers of

forest officers residing on or near the carriers' routes. Thus, the carriers as instructed by the postmasters will constitute a valuable supplement to the regular patrol maintained by federal and State officers, who are often unable, through lack of numbers, to give full protection. The plan is purposely extremely simple; the carrier will not necessarily be compelled to leave his vehicle or deviate from his course.

As can readily be seen, the effectiveness of the work will depend in a large measure upon the ability of the Forest officers and the postal employees to co-operate closely. Star route contractors and carriers are not ordered, but are requested, to co-operate.

The special order is as follows:

"In accordance with the request of the Secretary of Agriculture, this Department has arranged a plan of co-operation with State and National Forest officers whereby rural and star route carriers shall report forest fires discovered by them along their routes to persons designated by the State and National authorities to receive such intelligence.

"Co-operation with State officers will be given in the following States: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, West Virginia, Tennessee, Ken-

tucky, Michigan, Wisconsin, Minnesota, Idaho, Washington, Oregon, and California.

"The National Forest officers will be co-operated with in the following States: Florida, Arkansas, South Dakota, Wyoming, Colorado, New Mexico, Arizona, Utah, Montana, Idaho, Washington, Oregon, and California.

"The State and National authorities will inform postmasters as to whom the discovery of fires should be reported, and each rural carrier should be directed to co-operate to the fullest extent with such authorities in the manner agreed upon, namely, that the carrier shall report a fire to the nearest State fire warden or National Forest officer on his route, or, if no such warden or officer lives on the route, to arrange through some responsible citizen to have him notified, by telephone, if possible. Star route contractors and carriers are included in the plan of co-operation and should be requested to report the discovery of fires in the same manner as will be done by the rural carriers.

"Postmasters in or near National Forests are also directed to report fires to the nearest Forest officer."

Respectfully,

(Signed) P. V. DEGRW, *P. V. DEGRW,*

Fourth Assistant Postmaster General."

THE PRESENT FIRE SEASON ON THE NATIONAL FORESTS

UP to the middle of July the forest fire losses within the National Forests during the calendar year 1912 have been unusually light. A late spring, with plentiful rain, has characterized the general climatic conditions in the West.

The most serious fire of the season so far occurred on the Olympic National Forest, Washington, where 640 acres of cedar and spruce were covered by a crown fire which killed twenty million feet of Government timber and ten million feet of private timber. It was caused by the carelessness of

settlers in burning brush, and the whole area was devastated in about two hours because a strong wind was blowing at the time. Another fire destroyed 350,000 feet on the Rainier Forest.

Outside the National Forests, especially in portions of Washington, fires have been quite frequent in old slashings.

The total number of fires within District 6, which comprises the National Forests of Oregon and Washington, reported to the middle of July, is 43, of which only the two mentioned above caused much damage.

Further south, in California, which forms District 5, 154 fires have been reported up to July 20. These burned over a total of about 6,000 acres, of which one of 4,000 and another of 953 acres, both on Kern River, did the principal damage. While the weather conditions during the early part of the season greatly reduced the fire danger, the recent reports indicate that it is increasing, nearly one-half of all the fires having occurred in the last week reported. As yet, however, the damage has not been great, and the fire organization is working splendidly.

In District 1, which includes Michigan, Minnesota, North Dakota, Montana, and northern Idaho, the weather conditions during June were again conducive to safety for the forests. The dry weather in the first part of May resulted in a number of small fires, all of which were easily controlled. In these States there is a marked tendency on the part of lumbermen, railroads, and timberland owners to improve the fire situation by taking care of slashings and railroad rights of way. The Northern Pacific Railroad Company has adopted systematic clearing of its rights of way, which will materially lessen the fire hazard. The Great Northern and the Oregon-Washington Railroad and Navigation Company have signified their intention of doing likewise. The Northern Pacific has turned over its holdings in northern Idaho within the National Forests to the protection afforded by the timber protective associations. This will greatly strengthen the protective work in Idaho.

An agreement between Montana and the Forest Service, now in preparation, provides for the protection of State lands within and contiguous to the Forests, and relieves the Service of the patrol of districts containing large tracts of State timberland, thus permitting more intensive patrol by the Service in sections hitherto inadequately protected.

Idaho and Montana are expecting to secure funds under the Weeks law to augment their share in protecting timberlands. Altogether, the situation in this District is much improved over previous years.

The notable success of the Chicago, Milwaukee, and Puget Sound Railway in keeping down forest fire loss is due to the use of oil-burning locomotives. Their adoption by other roads will greatly lessen the fires in any forested country.

Up to June 20, 38 fires occurred within the National Forests of Michigan, Northern Idaho, North Dakota and Montana. These burned over about 2,500 acres, of which less than 80 acres were covered with merchantable timber. Twenty of these fires were started by railroad locomotives, 10 by campers, 1 from careless brush burning, 1 by incendiarism, and the rest were of unknown origin. Since then about the same number of fires, mostly small ones, have been reported; one, however, covered 331 acres. So far weather conditions have been good, yet it is not expected that the whole season will be passed without some considerable losses. Much will depend upon rains and the continued co-operation of the public, especially the campers and the railroads.

In the central Rocky Mountain region, District 2, a late spring with frequent rains has up to the present time been instrumental in holding down fire loss to a gratifyingly small amount. About 50 fires, mostly small ones, have occurred, but the damage has been negligible.

A grass fire burned over nearly 31,000 acres within the Nebraska National Forest, but as is well known, this is in the barren sandhill region and is only prospective timberland, since the most of the Forest is yet to be planted to trees.

Arizona and New Mexico, in District 3, up to the present time have suffered most, except for the crown fire on the Olympic in Washington. Reporting last on July 16, the District Forester states that 236 fires have occurred, burning over altogether 46,840 acres, and necessitating an expense for fighting them of about \$5,000, exclusive of salaries of Forest officers.

The most serious fire was in the Sitgreaves National Forest, in east-central Arizona, where lightning set a fire which spread lightly over 22,560 acres, consuming the forest litter and

killing 50 per cent of the young growth, but destroying practically none of the commercial timber. Another one, which burned over 4,000 acres within the Crook National Forest, was similar in character and effect. It, too, was caused by lightning, as the great majority of the fires in District 3 have been this season. Abundant, frequent showers set in about the middle of July, as is usual in that region. The total damage from these fires has been small, since many of the most extensive ones were grass fires.

In southern Idaho, Utah, and Nevada, in District 4, late snows, a backward spring, and frequent showers have been

unfavorable to fires. Only 11 fires have been reported, and the total damage was practically nothing.

Although there is yet plenty of time for disastrous fires, the situation so far is very gratifying to the officers of the Forest Service. While frequent rain has held down the fire loss so far, it has also, in connection with a long growing season during spring and summer, caused an unusually rank growth of grass and weeds within the open stands of timber. When this vegetation becomes dried out during possible later summer droughts, the fire menace will be increased.

RESOLUTION TO THE SENATORS

Each member of the United States Senate has been sent a copy of the following resolution which was adopted at the meeting of the Board of Directors of the American Forestry Association at Bretton Woods, N. H., on July 18, and asked to give his careful consideration of it.

Whereas, amendment 85 to Agricultural Appropriation Act (H. R. 18960, 62nd Congress, 2nd Session), page 50, provides that the Secretary of Agriculture is hereby directed and required to select, classify and segregate as soon as practicable, all lands within the boundaries of national forests that are suitable and fit for agricultural purposes, and as soon as such lands have been thus selected, classified, and segregated, the same shall be open to settlement and entry under the homestead law, be it

Resolved, That the American Forestry Association, a national organization, with a membership in every State in the Union, and with which numerous

State forestry organizations are affiliated, declares that the passage of this amendment would result in abuses such as took place before the National Forests were created, that many areas covered with enormous stands of valuable timber would pass to private ownership without settlement actually taking place; that it would prevent the Secretary of Agriculture withholding from entry lands which are of great value as water-power sites, for the developments of irrigation works and other purposes, as well as lands needed for public purposes, and be it

Resolved, That the American Forestry Association, declaring that the public interests would be seriously jeopardized by the passage of the amendment in its original form, and that it would be against public policy, solicits the careful consideration, by each member of the United States Senate, of the request that the amendment shall not be passed in its original form.

STUDYING FOREST CONDITIONS IN NEW YORK

FROM statistics gathered already by the State Conservation Department," says Hugh P. Baker, dean of the New York State College of Forestry at Syracuse University, in a letter addressed to the Conservation Commission, "we know that New York now secures only about one-fourth of the wood it uses from the lands of the State, sending outside the cost price for three-fourths of its wood. This means that New York is sending into other States several millions of dollars for wood that its 12,000,000 acres of forest land could be made to produce easily under scientific forest management. Such area of forest land, if properly managed, would not only supply fully the needs of the State, but there would be a large surplus which would bring considerable money back into the State as the material is exported."

These conservation facts and conclusions, brought home to the head of the State College of Forestry at Syracuse by the Conservation Commission's investigations and bulletins, have prompted the college to inaugurate this fall "A study of the wood-working industries of New York." In announcing this plan to the Conservation Commission, Dean Baker makes the following statement, which forecasts a valuable co-operation with the State department in the practical conservation of the State's forests and lands best adapted to growing trees:

"For some time various States and the National Government have felt the necessity of taking stock both of our forests and of the wood that we are using in our manufacturing and for other purposes. Until we do know definitely as to how much we have left in our forests and how much we are using annually, can we say exactly how long our virgin forest will last and how soon we must prepare for the time when all of our forests will be so-called "second

growth." The United States Forest Service began some three years ago this stock taking as far as the wood-working industries are concerned by making co-operative studies with various States. Such studies have been made in some ten or twelve States including New Jersey, Pennsylvania, Kentucky, Virginia, Michigan, Illinois, Iowa and Washington. On July 1st the study of New York conditions was begun and the Government Service considers it so important that it will open an office in New York City so that the various parts of the State may be more effectively covered by the agents of the New York State College of Forestry and the Forest Service.

"Blank sheets and cards are being sent out to manufacturers throughout the State, asking for the kinds of wood used, for what used, form, quantity in board feet, cost per thousand, and the source of the material used. Also what attempts have been made to use waste material for purposes other than fuel. As the data is gathered it will be tabulated with the idea of determining exactly the purpose for which the various woods are most generally used, how much is being used, its cost and where the State is getting it. From statistics gathered already by the State Conservation Commission, we know that New York now secures only about one-fourth of the wood it uses from the lands of the State, sending outside the cost price for three-fourths of its wood. This means that New York is sending into other States several million dollars for wood that its 12,000,000 acres of forest land could be made to produce easily under scientific management. Such an area of forest land, if properly managed, would not only supply fully the needs of the State, but there would be a large surplus which would bring considerable money back into the State as the material is exported."

STATE NEWS

Vermont

The Republican Party in Vermont has adopted the following plank in its platform:

"The maintenance of the forests of the State is of prime importance. We believe that adequate measures should be taken by the General Assembly to safeguard the forests from insect ravages, fires and other destructive agencies; that the forestry branch of the State government should be strengthened and that forest tracts suitable for nurseries and for demonstration of the most approved forestry methods should be acquired and utilized for these purposes in various parts of the State.

"We approve the present policy of encouraging private owners to re-forest their waste lands in an intelligent manner. Conservation of such woodlands should be fostered by a liberal tax policy."

The State has just acquired two new State forests: one of between 800 and 1,000 acres, including Bald Mountain in Mendon, about three miles from the city of Rutland; the other in Townshend of about 700 acres in the beautiful West River valley of Southern Vermont. Both of these tracts are admirably located for demonstration purposes.

Colorado

Every day has been Arbor Day high up on the slopes of Pike's Peak lately. Government forestry officials have been replanting a vast area which was fire swept more than fifty years ago. Hundreds of thousands of pine seed and young trees have been planted on barren slopes, marking the first important step toward reforesting the entire Rocky Mountain range—or so much as is included in the national forests.

With the denuded areas on the slopes of the Rockies covered with a sturdy growth of young trees, the snowfall in the mountains will be much slower in melting. This will hold back the waters which now rush to the Mississippi Valley from the Rocky Mountain watershed in April and May. These late floods have done the most damage this season, as their addition to streams already bank full has proved too great a strain for levees.

Minnesota

The importance of the forests in the southeastern part of Minnesota and the opportunities for further economic value are little realized, in the opinion of W. F. Cox, state forester, who returned yesterday from an extensive trip. The forestry service has

started an investigation of the situation, looking toward the protection of the forests in that portion of the State.

"Certain counties have about half forested land, in spite of the fact the country has been settled longer than other parts of the state," said Mr. Cox. "These lands, of course, are the rougher lands, either quite hilly or lie along the bluffs of the rivers, like the Zumbro and the Cannon. The forests consist of hardwood, oaks of several kinds, maple, elm, basswood and a great variety of other kinds.

"There is an opportunity for a great many small cities and villages to own municipal forests, particularly at the source of their water supply. Such forests would pay well and at the same time keep the source of water supply free from contamination. The bluffs along some of the rivers are all particularly adapted for municipal forests. They could be bought cheaply and would make beautiful parks."

South Dakota

Two years ago the forest service seeded with pine a tract of 500 acres near Savoy in the Spearfish canyon country and results manifest thus far show that the work will prove a success. The young trees are up over the entire tract and appear to be strong and healthy. In most instances they have already attained a height of six or eight inches.

In the Redfern district, where a tract of several hundred acres was seeded at the same time, the results have not been so successful, although in many places there a new growth of pine has started, which promises to develop well. On the whole, the growth there is not as good as in the Spearfish district, but the work is far from being unsuccessful.

New York

Nearly 3,000,000 acres of land in New York State, or about 8 per cent of the total area of the State, are in immediate need of reforestation, being now without profitable growth of any kind, is the statement of the conservation commission based on a careful survey just completed.

To encourage the farmers of the State to recover these waste lands and to instruct them how to restore and handle his woodlot so as to produce the best results is one of the important undertakings of the conservation commission, which was created by Governor Dix and the Democratic legislature.

The proper care and maintenance of growing forests and the restoration of lands which have been denuded but are not available for cultivation are important to the people of the State as a whole because of the effect of the forests upon rainfall and control of streams, but the reforestation of waste tracts under conditions which have been created by the conservation commission affords an opportunity for individual profit to the farmers while working for the general welfare of the State.

California

An increase of \$48,000 in the receipts from the national forests in California for the fiscal year ending June 31, 1912, over those for the previous 12 months is shown in the annual statement of receipts just issued from the main office in San Francisco of district 5 of the United States forest service.

The total receipts for 1911-1912 were \$272,433, against \$224,531 for 1910-1911. An increase in nearly all the departments from which revenue is obtained is shown in the report, timber sales being a particular feature with an increase of \$35,000 in the past year. In this time \$119,128 worth of timber was sold, against \$84,471 during the previous fiscal year.

For settlements on timber destroyed in the building of railroads and reservoirs or otherwise, \$6,347 was received in 1911-1912, and \$4,441 in 1910-1911. For timber trespass there is a decrease, \$7,451 being collected against \$12,205 for the previous year; \$95,504 was paid for grazing privileges, an increase of \$4,000 for the last year. For water power approximately \$42,000 was received compared with \$31,000 the year before.

Kentucky

Prof. Arthur M. Miller, dean of the College of Arts and Sciences, and professor of geology at Kentucky State University, has written an interesting paper on the proposed arboretum for the Capitol grounds at Frankfort in which he points out the difficulties in the way of having each county in the State represented by a separate species of tree, and mentions the objection which any county would have to being typified by the sassafras or persimmon, everywhere standing for poor land, and the unpoetic associations of the pignut. Prof. Miller suggests that before it is too late a section of a mammoth Kentucky oak should be secured, on which, when polished as a scroll, the principal events of Kentucky's history should be recorded, making it similar to the famous tablet in the Kensington Museum in England. Prof. Miller's paper contains a striking and instructive history of the native trees of Kentucky.

Pennsylvania

Thirty-five sophomore forestry students of the Pennsylvania State College are encamped for the summer in N. P. Wheeler's "forest primeval," Forest county, under the supervision of Professor Clark, head of the Forestry Department of State College, and his assistants. Mr. Wheeler is showing them a few of the original "big sticks" and a good field is offered both for a scientific and practical study of forestry.

New York

"We have eleven million baby trees ready for distribution among the people of the State of New York," is the statement made at the New York State, Forest, Fish and Game Bureau.

These small trees are to be sold within the State at the extremely low price of \$4 a thousand.

This, it is asserted by the bureau officials, shows that New York has taken the lead in the great forestry movement that now is sweeping the whole country. It is declared these eleven million trees mean the salvation of this State in the years to come.

The bureau officials say that the spirit of conservation is manifest in all the cities as well as in the rural districts, the question being recognized as vital to the nation. New York plainly is leading the great movement.

Growth of tree culture sentiment nowhere is in greater evidence, assert the expert foresters. One tree grower wants an almost unlimited number of white pine trees from six to fifteen feet high. The stipulation is that these trees must be growing from six to twenty feet apart in a loam, preferably not more than four miles from a railroad.

Texas

Texas is the largest State and has more forested area than any other, though the total stand of its timber is much below some of the rest. The area of its woodland has been placed at about 40,000,000 acres; but it is difficult to draw the line between forested and unforested land in the State. There are all grades and degrees from the heavily timbered pine belts of the east to the thinly covered brush land in some of the central, southern and western parts. Much land is covered with tree growth and yet is incapable of producing a large amount of merchantable lumber, because the trees are too small for milling purposes. There is room for difference of opinion as to where the lines should be properly drawn between the timbered and untimbered portions of Texas. The estimate of 40,000,000 acres land includes only that which now is capable of yielding a reasonable amount of saw timber per acre and does not include wide expanses of brush.

California

A newspaper report says: A considerable fortune is being spent by wealthy Californians in an effort to save groves on beautiful estates near this city from a blight that has recently attacked most of the trees. Tree surgeons are gathering here from various parts of the country and are working hard under offers of large rewards if they can stop the destruction. Should they fail, it is probable that foresters will be brought from Europe.

The blight is in the form of a fungus known as the *volsairia* bacteria. After it has taken hold on a tree thousands of worms develop. They are much like the carpenter borer. These pierce the bark through and through, and sometimes make large holes. Their ravages were not detected until many of the fine shade trees wilted this season and were threatened with quick death. Tree authorities of Stanford University were called in and found that the blight extended among the estates in beautiful Menlo Park. They also discovered that the disease was spreading rapidly to the north.

New Jersey

The report of the New Jersey Forest Commission for 1911 is being distributed. This

shows that the chief effort of the Commission is to give value to the forests through fire control. The State owns and can own no important part of the forests within her borders, but by encouraging and helping those who do own them a better order will be established.

In New Jersey most forest fires occur in the spring, and the spring of 1911 was so exceptionally dry that the fire hazard was greatly increased. Nevertheless, the fire service which has been developed during six years succeeded in lessening the number of fires by 13 per cent., and in reducing total damage by 32 per cent. over what was suffered the previous year. In neighboring States under similar conditions the fire loss was from two to five times as great as that of the preceding season. The report points out that most of the railroads are doing their utmost to prevent fires. Their employees and the firewardens succeeded so well in meeting the situation that of 200 fires started only 17 burned as much as ten acres. A strong indication of the railroads' interest is found in the statement that they have built 235 miles of fire lines, practically voluntarily, and at their own cost. Of the 64 fires due to brush burning some were serious, though what might have happened is suggested by the showing that upwards of 2,400 brush burning permits were issued.

PRESERVATION OF MINE TIMBERS

The Forest Service has issued Bulletin 107, treating of the "Preservation of Mine Timbers." Practical methods of increasing the durability of timber are given. First, peeling is advised, by which simple and inexpensive treatment the life of timber is increased from 10 to 15 per cent. Seasoned timber, it is claimed, will last 25 per cent longer in a mine than green timber and hence it is advised that the timber be seasoned in the woods before shipping.

INVENTORY OF FOREST LANDS

In accordance with the requirement that it investigate phases of forestry of value to all the people of the State, the new State College of Forestry at Syracuse University is, taking an inventory of New York's forest lands. Although New York no longer ranks as one of the big lumber producing States, it is not without resources in its forests. Dean Baker of the College of Forestry believes that scientific management would make them vastly greater and an important benefit.

NEWS AND NOTES

Canadian Forestry Association

Much interest is being taken in the forthcoming annual meeting of the Canadian Forestry Association which will take place in Victoria, B. C., from September 4 to 6. Not for six years has the gathering been held on the Pacific Coast. The Province of British Columbia has just enacted a new timber and forestry law and is adopting a progressive attitude in regard to the conservation and proper disposal of its invaluable timber wealth. Much concern is evidenced on the Coast in regard to the new law and to modern methods of lumbering and clearing the pulp wood off the limits. A conference on farm forestry will be one of the features of the Seventh International Dry Farming Congress, which will be held in Lethbridge, Alta., from October 21 to 26. Dr. A. R. Myers, of Moncton, N. B., set out 40,000 white pine last spring and all are thriving. The owner expects to plant 50,000 more this season and 100,000 more white pine early next spring.

Boy Scouts Aiding

Nearly 100 scoutmasters representing the Boy Scouts of America in Pennsylvania, have appointed five wardens to serve during the present year.

These scoutmasters are located in various counties throughout Pennsylvania, and are empowered to exercise to the full powers of fire wardens should forest fires occur at any point within their jurisdiction.

Members of the Boy Scout troops are co-operating in the work of preventing forest fires, and it is reported much valuable work along this line has already been done by the boys.

These appointments have been made by Robert S. Conklin, commissioner of forestry of Pennsylvania, upon the suggestion of the executive officers of the Pennsylvania Chestnut-tree Blight Commission. The commission was inspired to make this suggestion by the great value of the services of the Boy Scouts in detecting the presence of chestnut-tree blight, and in reporting the location of the diseased trees to the commission. National and State authorities have heartily commended the scouts for their interest in forest conservation.

Sewall in Maine

James W. Sewall, formerly forestry manager of the Appleton & Sewall Co., of New York City, has opened an office at Old Town, Maine, where he will continue his business of the mapping or surveying of wild lands, or the estimation of timber. Mr. Appleton has been in ill health for some time and the

firm decided to give up its forestry work on that account. Mr. Sewall has with him the almost intact field force of the company.

Hickory Trees Killed

Numerous magnificent hickory trees have been killed by the pernicious hickory bark borer in the vicinity of New York City. It has destroyed thousands of trees in the central part of the State, while recent investigations show that it is at work in the Hudson Valley, near Tivoli, and probably is injurious in numerous other places. The severe droughts of the last two or three years have undoubtedly been favorable to the development of the pest, since the vitality of many of the trees has been lowered, and they have been thus rendered more susceptible to attack by insect enemies.

Wireless in Forests

Wireless telegraph stations for use in transmitting messages to rangers when forest fires are discovered are to be built on summits in various sections of Vermont. The first station is to be built on Mt. Pico, ten miles east of Rutland, at an altitude of 3,900 feet.

Other stations will be erected on mountains to the north.

Forests in China

The United States Consular Report says: Forestry is a subject in which the Chinese evince no interest, as there are no forests in that country. The Great Plain, on which Tien-Tsin is located, never had forests, being entirely of delta formation, and the mountainous regions to the north and west were denuded of their forests centuries ago. The surface soil of these mountains has been washed away, and to reforest them would be a matter of great difficulty. The only nurseryman in this consular district is F. Bade, of the Tien-Tsin Nursery Gardens, who is much interested in tree culture. He raises various shade and ornamental trees from seed, but the soil of the Great Plain is alkaline and comparatively few varieties of trees will flourish in it. A British corporation engaged in mining and shipping has a concession for coal mining in the Kaiping district, about eighty miles northwest of Tien-Tsin. The surface of the region is broken by hills from fifty to two hundred feet high, which are absolutely bare of trees, and the company has begun work of afforestation. It already has 1,000,000 young trees growing, chiefly acacia, and is preparing to establish a nursery for them on an extensive scale.

New York's Oldest Tree

The oldest tree on the Island of Manhattan, one that is declared to be more than 303 years old, has had its identity established and the authenticity of its age proved by the city administration after a thorough investigation into its right to be called the oldest inhabitant.

This is the discovery of a living tree that flourished when Hendrik Hudson in the good ship Half Moon sailed up the river which was to receive his name.

The city has taken this tree under special care and henceforth it is to be guarded from vandalism and as much as possible from the ravages of insect warfare and the natural process of decay.

The tree is a tulip, and a giant at that. The trunk at the base is about 24 feet in circumference. The trunk bifurcates eight feet from the base. Its top reaches up about a hundred feet and near the top it spreads out like a big elm with generous shade.

It is the only tree so far as known that existed before the first Hollanders set foot on Manhattan soil.

Reforestation at the Capital

Reforestation of the Capitol grounds by prominent statesmen is the latest fad at Washington. The old German custom of planting a tree every time one is destroyed has been inaugurated, and there is a rush among Congressmen for planting privileges.

A purple beech that grew in northern New York, near the home of Vice-President Sherman, now adorns the Capitol grounds, near Delaware avenue and B street northeast, at the brow of the hill on the north drive.

Other public men, including Speaker Clark, former Speaker Cannon and a number of prominent candidates, will be invited to plant trees, and there promises to be a lively arbor campaign. Among the trees that will be planted are the walnut, hickory and red oak, each man selecting the tree under which he loved to linger in his boyhood.

Superintendent Elliott Woods is providing photographs of the recent tree planting, to be filed away with the official records, and reforestation is now having its innings on the Capitol grounds.

Boy Scouts to Save Trees

The Boy Scouts of America have leagued themselves together as an army to save the trees and shrubs of America from insects and diseases. The work started in Pennsylvania, where thousands of chestnut trees are being destroyed. The boys have been of great help to the Forestry Department in detecting this disease and reporting the trees thus afflicted to the department.

That work afforded an excellent piece of scouting for boys, and the result has been that Boy Scouts throughout the country have written to James E. West, Chief Scout Executive of the Boy Scouts of America, asking for information about other diseases and insects that attack trees and shrubs. As a result George H. Merritt, one of the secretaries employed by the Boy Scouts of America, is compiling, with the aid of Gifford Pinchot, former United States Forester, and member of the National Council of the Boy Scouts of America, a chapter for the manual and for the scoutmasters, outlining different diseases of the most important trees.

Appointed as Forester

E. C. M. Richards has been appointed temporarily as forester of the Park Department of Queens Borough, New York. The examination for a permanent appointee will be held in the near future. Mr. Richards was graduated from the Sheffield Scientific School and from the School of Forestry at Yale University.

A New Douglas Spruce

Arthur Smith, of Reading, Pa., writes that a French explorer, Dr. Dode, has discovered a new species of *Pseudotsuga*, the habitat of which is a limestone district, 8,000 feet above the sea, in the province of Yunnan, China. It is reported to be closely allied to *Pseudotsuga Japonica*, Beissner, a native of Japan and Formosa, with which it agrees in having its leaves emarginate at the apex, but differing in having larger cones and seeds, with more numerous scales. The new species has been named *Pseudotsuga sinensis* Dode, and it appears probable that it will prove a valuable addition to our cultivated forest trees.

May Form Forest Protective Association

Wisconsin paper and pulp manufacturers are interested in a movement started at a meeting held at Oshkosh, looking toward the formation of a forest protective association operative in the northern forests of Wisconsin. Several of the companies were represented at the meeting. Lumbermen and timber land owners predominated, however. After debating and discussing the question one entire day, the meeting voted that preliminary steps be taken in the matter of forming a definite organization. More than a half million acres of timber land were spoken for at the meeting, and it is believed that this amount can be more than doubled when active organization work is undertaken.

EDUCATIONAL

Appointments at Syracuse

Since Dr. Hugh P. Baker, formerly in charge of the Department of Forestry at the Pennsylvania State College, took charge of the New York State College of Forestry at Syracuse University on April 1st, the following additions have been made to the Forestry Faculty:

Professor Frank F. Moon, who for the past two years has been in charge of Forestry at the Massachusetts Agricultural College, comes to the College as Professor of Forest Engineering. Professor Moon is a graduate of Amherst College and the Yale Forest School, 1909. After working for the Forest Service in Texas, he was appointed Forester of the Highlands of Hudson Forest Reservation, and while connected with the Forest, Fish and Game Commission of New York, prepared a bulletin on the Forest Conditions of Warren County, New York. Professor Moon will spend the coming summer in Germany.

Professor Philip T. Coolidge, who has been Director of the Forest School of Colorado College, will take charge of the Ranger School of the New York State College of Forestry on July 1st. Professor Coolidge is a graduate of the Harvard Forest School and after two years' work with the Government in the West, took charge of the Colorado School of Forestry, which he has brought to high efficiency.

Professor Nelson C. Brown, who has been teaching in the Department of Horticulture and Forestry in the Iowa State College during the past year, takes up work with the College on July 1st as Assistant Professor of Forest Utilization. Professor Brown was graduated from Yale University in 1906, and from the Forest School in 1908. During 1908 he was Forest Assistant on the Absaroka Forest in Montana and in 1909 became Deputy Supervisor on the Gallatin Forest. During a portion of 1910 Professor Brown was an instructor in the Yale Forest School Camp at Milford, Pa., and in the fall of 1910 was assigned as Deputy Supervisor on the Kaniksu National Forest.

Professor John W. Stephen, who had been a Forester with the Forest, Fish and Game Commission of New York since the spring of 1908, came to the College of Forestry on April 15th as Assistant Professor of Silviculture. Professor Stephen is a graduate of the University of Michigan, and in 1907 received from that Institution the degree of M. F. During 1907 and 1908 Professor Stephen was in charge of the Michigan Forest Reserve and during the same year acted as Instructor in Forestry in the Uni-

versity of Michigan. Since taking up work in New York, he has had much to do with the planting of waste lands in the Adirondacks and developed the State Nursery at Salamanca. While connected with the State he published a report on a Forest Survey of Oneida County, New York, and on the Basket Willow Industry of the State.

In the fall of 1912 Professor Edward F. McCarthy came to the College of Forestry as an Assistant Professor, and will have charge of the work in Dendrology and Wood Technology. Mr. McCarthy graduated from the Forest School of the University of Michigan in 1911, and during his last year there assisted Professor Roth in the course in Technology. During 1910 he was employed by the Ohio State Forestry Department and in June, 1911, became a Forest Assistant on the Caribou Forest in Idaho.

Students in the Forest

The students of the Forestry Department of the Missouri Agricultural College are making a study during the summer months of the forest conditions in the pine forests of Shannon County. A camp has been established near Eminence on the Current River on the holdings of the Missouri Lumber and Mining Company, of which Capt. J. D. White, the president of the National Conservation Commission, is the president and general manager. The students live in tents, cook their own meals and by "living next to nature" learn to be "woods wise."

Biltmore Doings

The Biltmore Forest School students leave Cadillac on the 6th of August, for the western headquarters, established since 1911, on the holdings of the famous C. A. Smith Timber Co. at Marshfield, Oregon. En route to the West, they will visit the National forests and the logging operations in Idaho and on Puget Sound, and are looking forward, with keen anticipations, to the lessons of the West in practical American forestry. Their address, after August 18th, is Marshfield, Oregon.

The degree of Bachelor of Forestry was granted, upon the completion of the statutory conditions, to G. W. Thompson and J. K. Esser, in the U. S. Forest Service; R. V. Myers, with the Champion Lumber Company; Harry S. Welby and Hubbard Hastings, with the C. A. Smith Timber Co.; P. A. Guibord, with the Laurentide Paper Company; Christopher Swezey, with the American Forestry

Company; and H. H. Goodale, with the Paul Lumber Company.

The degree of Forest Engineer was conferred on A. H. King, N. Y. State Forester, Biltmore, B.F., 1909, on a thesis entitled: "The Growth of Spruce in Maine."

S. S. Converse, Biltmore, 1912, was married to Miss Alice Merle King, daughter of Mr. and Mrs. H. W. King, at East Longmeadow, Mass., on June 12th, 1912. Converse has accepted a position with the Diamond Match Company. We congratulate Milo most heartily.

Irving Southworth is employed on the Plumas Reservation in California.

W. W. Watkins, Biltmore, 1910, is again in the tie business for the Joyce-Watkins Co., with headquarters at Nashville.

D. E. Lauderburn, Biltmore, 1905, is a member of Vitale and Rothery, Forest Engineers, with offices at 1133 Broadway, New York.

Raymond Mount, Biltmore, 1908, is Vice-president of the Gillette-Mount Lumber Company, at 50 Church Street, New York

AMERICAN FORESTRY ASSOCIATION ENDORSED

The following resolution was presented and adopted at the meeting of the Society for the Protection of the New Hampshire Forests at Bretton Woods, N. H., on July 19:

Whereas, The American Forestry Association, the only national public service organization devoted to the cause of forest conservation, has been of great service to New Hampshire, as well as many other States, in working for desirable forest legislation, and ma-

terially aids in the effort to secure forest reservations, be it

Resolved, That the Society for the Protection of New Hampshire Forests urges its members to give their active support to the American Forestry Association, and to aid it in the important and patriotic work it is doing for forest conservation, by becoming members of the American Forestry Association and subscribers to its magazine.

CITIZENSHIP AND FOREST FIRES

The Oregon Forest Fire Association has posted a new forest fire warning throughout the timbered counties. It reminds the reader that good citizenship demands the observance of the forest fire laws, and that a little care may result in the saving of thousands of dollars, for the forests of Oregon distribute more wealth in the State than grain, fruit, vegetables and fish combined. This warning also calls attention to the fact that Oregon timber owners pay more than one-third the taxes of the State.

ANOTHER WOOD WASTE ELIMINATED

By a series of experiments extending over the past six years, the Department of Agriculture has found that California grapes packed with a filler of redwood sawdust keep better and longer in cold storage than when packed in ground cork.

Redwood sawdust has been found to be peculiarly adapted to use in fruit packing, as it is more nearly neutral in odor and flavor than even ground cork and therefore does not impart its taste or odor to the fruit, as would the sawdust from other kinds of wood.

CURRENT LITERATURE

MONTHLY LIST FOR JULY, 1912

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Proceedings and Reports of Associations, Commissions, Forest Officers, etc.

Forestry association of Vermont. Proceedings, 1911. 31 p. Burlington, Vt., 1912.

India—Ajmere-Merwara—Forest dept. Annual report on forest administration for 1910-1911. 30 p. Mount Abu, 1911.

India—Punjab—Forest dept. Progress report of forest administration for the year 1910-11. 74 p. Lahore, 1911.

Indo-China, French—Service forestier. 10th Rapport annuel sur l'organisation et le fonctionnement du service. 40 p. 1910-11. Hanoi, 1911.

Interstate conference on forestry, Sydney, 1911. Report of the proceedings. 52 p. Sydney, Australia, 1912.

Massachusetts forestry association. Register for 1911. 45 p. Boston, 1911.

Ontario—Dept. of lands, forests and mines: Report for year ending 31st October, 1911. 114 p. Toronto, 1912.

Society for the protection of New Hampshire forests. Tenth annual report, 1911. 106 p. pl. Concord, N. H., 1911.

Forest Aesthetics

Street and park trees

Cromie, George A. and Filley, Walter O. The planting and care of street and highway trees. 19 p. pl. New Haven, Conn., 1912. (New Haven—Civic federation. Document no. 8.)

Forest Education

Forest schools

Colorado college—Dept. of forestry. Announcement, 1912-13. 23 p. pl. Colorado Springs, 1912.

Hawes, Austin F. A summer school of forestry and horticulture, to be held at the Downer state forest, Sharon, Vt., Aug. 13 to 24, inclusive, 1912. 10 p. pl. Burlington, Vt., 1912. (Vermont—Forest Service. Publication no. 10.)

Arbor day

Illinois—Dept. of public instruction. Arbor and bird day, 1910. 76 p. il. Springfield, Ill., 1910.

Forest Botany

Trees, classification and description

Elliott, Simon B. The important timber trees of the United States; a manual of practical forestry. 382 p. pl. Boston, Houghton Mifflin Co., 1912.

Garman, H. The catalpas and their allies. 21 p. il., pl. Lexington, Ky., 1912. (Kentucky—Agricultural experiment station. Bulletin 164.)

Johns, Chas. Alexander. British trees, including the finer shrubs for garden and woodland. 285 p. il., pl. London, G. Routledge & Sons, 1911.

Maiden, J. H. The forest flora of New South Wales, pt. 47. 22 p., pl. Sydney, Gov't printer, 1912.

Silvics

Studies of species

Loughbridge, R. H. Tolerance of eucalyptus for alkali. 71 p., il. Sacramento, 1911. (California — Agricultural experiment station. Bulletin 225.)

Forest Protection

Insects

Hole, R. S. Bark-boring beetle attack in the coniferous forests of the Simla catchment area, 1907-1911. 21 p. Calcutta, 1912. (India—Forest dept. Forest bulletin 10.)

Iyer, V. Subramania. A further note on some Casuarina insect pests of Madras. 9 p., pl. Calcutta, 1912. (India—Forest dept. Forest bulletin no. 11.)

Snyder, T. E. Insect damage to mine props and methods of preventing the injury. 4 p. 8° Wash., D. C., 1912. (U. S.—Dept. of Agriculture—Bureau of entomology. Circular 156.)

Fire

Potlatch timber protective association. Annual report, 1911. 19 p. Potlatch, Idaho, 1912.

Forest Management

Appleton and Sewall Co., inc. Applied forestry; written particularly for owners and managers, explaining certain methods of foresters toward conserving property values and providing maximum returns from current operations. 34 p. il. N. Y., 1912.

Baker, J. Fred. The Michigan woodlot. 14 p. il. East Lansing, Mich., 1912. (Michigan—Agricultural experiment station. Circular 17.)

Forest mensuration

French, Truman R. French's scientific timber cruiser; a compendium of valuable information for cruisers or estimators of timber, sawyers, millmen or owners of timber lands. 36 p. il. Los Angeles, Cal., T. R. French, 1910.

Forest Engineering

Surveying and mapping

United States—Dept. of agriculture—Forest service. Signs, symbols and colors; supplement to the Instructions for making forest surveys and maps. 12 p. il., map. Wash., D. C., 1912.

Forest Utilization

Lumber industry

Bryant, R. C. An outline for a field study of a lumber operation. 24 p. New Haven, Conn., 1912.

Wood-using industries

Maxwell, Hu and Hatch, Chas. F. The wood-using industries of Texas. 18 p. New Orleans, La., Lumber trade journal, 1912.

Forest by-products

Cross, C. F., and others. Wood pulp and its uses. 270 p. il. N. Y., D. Van Nostrand Co., 1911.

Pearson, R. S. Commercial guide to the forest economic products of India. 155 p. pl., map. Calcutta, India, Supt. govt. printing, 1912.

Thickens, J. H. Experiments with jack pine and hemlock for mechanical pulp. 29 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service.)

Wood preservation

American wood preservers' association. Proceedings of the 8th annual meeting held at Chicago, Jan. 16-18, 1912. 302 p. il. Baltimore, Md., 1912.

Auxiliary Subjects

National parks

United States—Dept. of the Interior—Office of the Secretary. General information regarding Crater Lake national park, season of 1912. 10 p. maps. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Glacier national park, season of 1912. 9 p. map. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information

regarding Mesa Verde national park, season of 1912. 24 p. il. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Mount Rainier national park, season of 1912. 19 p. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding the Sequoia and General Grant national parks, season of 1912. 22 p. map. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Yellowstone national park, season of 1912. 30 p. maps. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Yosemite national park, season of 1912. 22 p. map. Wash., D. C., 1912.

Periodical Articles

Miscellaneous Periodicals

American city, April 1912.—Protection of shade trees against insects, by A. T. Hastings, p. 644-6; Caring for twenty-three hundred elm trees, by C. F. Lawton, p. 656.

American city, May 1912.—Insects and shade trees, by E. P. Felt, p. 731-2.

Annals of American academy, May 1912.—Timber bond features, by T. S. McGrath, p. 1-8, suppl.; Science of timber valuation, by J. D. Lacey, p. 9-22, suppl.; Questions of law encountered in timber bond issues, by E. E. Barthell, p. 23-44, suppl.; Accountant's relation to timber bond issues, by A. F. Jones, p. 51-8, suppl.; Waste material as a source of profit and added security on timber bonds, by W. J. Cummings, p. 76-80, suppl.

Breeder's gazette, July 10, 1912.—Forest service range reconnaissance, by Arthur D. Read, p. 50-1.

Gardners' chronicle, June 8, 1912.—Humus, by Alger Petts, p. 373.

Harpers' magazine, July 1912.—The secret of the big trees, by Ellsworth Huntington, p. 292-302.

National geographic magazine, June 1912.—Our national parks, by L. F. Schmeckebier, p. 531-79; Scenes among the high Cascades in central Oregon, by Ira A. Williams, p. 579-92; The great white monarch of the Pacific northwest, by A. H. Barnes, p. 593-626.

National wool grower, June 1912.—Range improvement and methods of handling stock in national forests, by J. T. Jardine, p. 7-10.

Outing, June 1912.—Windbreaks for the country home, by E. P. Powell, p. 372-6; Profit from trees on waste land, p. 377-8.

Outlook, May 25, 1912.—Something of a problem; forest rangers, by C. H. Shinn, p. 174-80.

- Overland monthly, May 1912.—Conservation and the farmer, by C. B. Lipman, p. 473-8.
- Plant world, July 1912.—The behavior of the nectar gland in the cacti, by Francis E. Lloyd and Chas. S. Ridgway, p. 145-56.
- Quarterly journal of economics, May 1912.—Lumber grading in the Pacific northwest, by V. Curtis, p. 538-44.
- Scientific American, May 11, 1912.—Zapote tree as a source of chicle, p. 528.
- Scientific American, May 18, 1912.—Most expensive wood in the world; cabole, p. 444.
- Scientific American, May 25, 1912.—Method of making pulp lumber, by M. T. S., p. 475.
- Scientific American, June 15, 1912.—How we can utilize \$250,000,000 worth of wasted timber, p. 537, 547-9.
- Trade journals and consular reports*
- American lumberman, June 15, 1912.—Incidental features of logging operations, p. 58-9.
- American lumberman, June 29, 1912.—Some construction timbers of the Philippines; tanguile, by H. N. Whitford, p. 37.
- American lumberman, July 6, 1912.—Some construction timbers of the Philippines; apitong, by H. N. Whitford, p. 29; Durability of wood, p. 29; Merits of wood blocks for street paving, p. 49.
- Canada lumberman, June 15, 1912.—Modern methods of timber estimating, by T. Read, p. 48-9.
- Canada lumberman, July 1, 1912.—Interesting facts about timber cruisers, p. 50-2.
- Engineering magazine, May 1912.—Refractory building material; a new non-combustible wood substitute for building purposes, by C. L. Norton, p. 279-81.
- Hardwood record, June 25, 1912.—Forests as climate regulations, p. 31; Increasing kiln capacity, p. 32-3; Cell structure of oak and gum, p. 33-4; Forest fires; what they cost, how they start, how to prevent them, by Chas. H. Flory, p. 35; Wooden pails and shoe pegs, p. 38-9; Cherry birch for gunstocks, by S. J. R., p. 39; Burls and bird's-eye, by S. J. R., p. 41-2.
- Hardwood record, July 10, 1912.—Making wood distillation history, p. 26-8; Yellow poplar and cucumber, p. 33; Splash damming on the Big Sandy, p. 34a-36.
- Lumber world review, June 10, 1912.—Forestry work in the state of Massachusetts, by John M. Woods, p. 19-20; Sugi finish applied to cypress, p. 18-19, 27.
- Naval stores review, June 27, 1912.—The naval stores industry of France; its origin, development, acreage, annual crops, home consumption and exports, p. 3-13; The working of the French pine forests; the prices of turpentine; the values of the lands, p. 13-14; What the maritime pine has done for France, p. 16-22; The maritime pine in the United States, p. 26; The naval stores industry in Spain, p. 28-31; The naval stores industry in Greece, p. 33-4; Developing naval stores industry in Japan; worked in a petty way by numerous small farmers, p. 34; Rosin production in Prussia, p. 50.
- Paper, July 3, 1912.—Bamboo as papermaking material, by William Raitt, p. 17-18; Forest workers in Germany, p. 19.
- Paper, July 10, 1912.—Mechanical pulp from Jack pine and hemlock, p. 15-16; Wood-pulp yarn; its manufacture and uses, by W. P. Dreaper, p. 17-18.
- St. Louis lumberman, June 15, 1912.—The Yale forest school in Arkansas, p. 79.
- Southern industrial and lumber review, June 1912.—Standing timber values; Texas forests and their values, by F. A. Briggs, p. 37.
- Southern lumber journal, June 15, 1912.—Wood for car wheels; timber faults pointed out by odd names to the wheelwright, p. 35.
- Southern lumberman, July 13, 1912.—Methods for utilization of wood waste, by George Walker, p. 41-2.
- Timberman, June 1912.—Practical forestry schools have ever broadening field of usefulness, p. 20-1.
- United States daily consular report, June 20, 1912.—Chinese wood oil, by Roger S. Greene, p. 1226-7.
- United States daily consular report, June 30, 1912.—Russian state forests, by John H. Grout, p. 1231.
- United States daily consular report, July 12, 1912.—Chinese lackwood furniture, by George E. Anderson, p. 202-3.
- Wood craft, July 1912.—Varying characteristics of the same woods, by Samuel J. Record, p. 108; Various tables; their development, design and construction, by John Bovingdon, p. 110-13; Microphotographs of the structure of wood, p. 114-15; Refractory woods and some substitutes for them, by Chas. L. Norton, p. 116-18.
- Wood-worker, June 1912.—Manufacturing piano sounding boards, by E. E. D., p. 27; Relative merits of red and white oak, by George Keller, p. 35-6; The Hawaiian cabinet wood, Acacia koa, by J. S. Bailey, p. 40.
- Forest journals*
- Allgemeine forst-und jagd-zeitung, May 1912.—Wald und sturm, by Vogl, p. 145-51; Forstliche reisenotizen aus Südtalien, by A. Müller, p. 151-5; Die normalertragstefeln im dienste der praxis, by Eberhard, p. 155-62.
- Allgemeine forst-und jagd-zeitung, June 1912.—Die fürstlich Isenburgischen waldungen bei Birstein, by Reiss, p. 181-96.
- Canadian forestry journal, May-June 1912.—A forestry students' camp, by R. B. Miller, p. 59-61; Les usages du Bouleau à papier, p. 62-3; Quebec Province starts forest planting, p. 63-5; Our forest re-

- serve problem, by J. R. Dickson, p. 66-71; Measures for the prevention of forest fires, by M. Kienitz, p. 74-8.
- Centralblatt für das gesamte forstwesen, May 1912.—Versuche über individuelle auslese bei waldbäumen, by E. Zederbauer, p. 201-12.
- Forestry quarterly, June 1912.—National forest timber sale contract clauses, by Theodore S. Woolsey, p. 139-83; Light burning versus forest management in northern California, by Richard H. Boerker, p. 184-94; The effect of forest fires on trees and reproduction in southern New England, by P. L. Buttrick, p. 195-207; How the insect control problem compares with the fire problem on national forests in District 5, by John M. Miller, p. 208-14; A new method of constructing volume tables, by Donald Bruce, p. 215-21; Rainfall a factor of tree increment, by Francis Davis, p. 222-8; The equipment and operation of a Prussian seed extracting establishment, by A. B. Recknagel, p. 229-34; North American species in Hungary, by Karl Petraschek, p. 235-6; Girdled trees, p. 237; Two minor wood industries, by C. S. Judd, p. 238-42.
- Forstwissenschaftliches centralblatt, May 1912.—Der gegenwärtige stand der humussäurefrage, by H. Bauer, p. 247-54; Über das sichlichten und die behandlung älterer kiefernbestände, by C. Frömbling, p. 254-62.
- Indian forester, May 1912.—The need of fire-protection in the tropics, by C. E. C. Fischer, p. 191-221; Peridermium cedri as a destructive fungus, by R. S. Troup, p. 222-3.
- Revue des eaux et forêts, June 1, 1912.—Conifères; essais de table aux dichotomiques pour la détermination des espèces, by L. Pardé, p. 340-1; Mouvement forestier a l'étranger; Autriche, by G. Hufel, p. 342-4.

E. T. ALLEN VISITS SOUTH SEA ISLANDS

Completing on ocean trip of some 8,860 miles, E. T. Allen, forester of the Western Forestry and Conservation Association, has returned from Tahiti, and again taken up the great work of forest fire prevention. Mr. Allen contracted the Society Island habit some years ago. On his return to Portland after this last trip he said the South Sea Islands looked better than ever before, with crop prospects down there indicating a probable increase in the use of fir from Oregon and Washington.

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FROM RED LAKE TO RAINY RIVER

By WILLIAM T. COX, *Minnesota State Forester*

A NUMBER of people have asked me to write an account of a recent snow-shoe trip across the Red Lake country in Northwestern Minnesota. Most of these people expected to elicit a tale of hardships and a description of worthless wild country. These I cannot relate. The trip was an easy one, if mushing on Indian snow-shoes can be considered easy at best; and the country traversed, far from being worthless, contains great areas of as rich land as can be found in the state. It is with the hope of dispelling some of the misconceptions regarding the region in question that I have decided to write this article.

There is a popular notion that the country for some distance east of Red Lake is for the most part a sparsely timbered swamp, and that the country north of the lake is one vast muskeg too wet even for travel and utterly unfit for habitation. These notions are absolutely wrong. The object of my trip was to find out at first hand just what the forest is like and what the land is good for so that the State Forest Service may pursue the proper policy with reference to the whole region.

Since there is a lack of roads and trails through the territory covered, we traveled on "webs." They were of the Chippewa style and in size 14x48 inches. They were made by Forest Patrolman Albert Smith, who is an expert at making snow-shoes and who knows the Red Lake and Rapid River countries better than any other man. Mr. Smith, his dog Togo and myself constituted our party.

Togo, a powerful and tireless dog, on the order of a "husky," but larger,

hauled a toboggan with all our provisions, blankets, a tent and a little stove. He followed along in the trail made by our snow-shoes and would eat nothing but rabbits. Rabbits were everywhere plentiful and easy to shoot with a pistol or snare at night on their runways.

From the Minnesota & International Railway to Red Lake there is a rich district, rather level but well drained and in most places covered with a splendid stand of hardwood, birch, elm, oak and especially poplar, very tall and of excellent quality. This is one of the very best hardwood districts of the state. There is also a good deal of white pine, cedar, tamarack and spruce. Much of the land has been logged off and settlers are rapidly clearing it up. Wherever cultivated, the heavy soil produces excellent crops and there are good local markets in the nearby logging camps and mill towns. The settlements along near the southeast and east shores of Red Lake show every indication of being prosperous considering their recent establishment.

On account of the great variety of tree growth, there is upon nearly every claim some kind of timber that can be marketed at a profit during the winter. Poles, posts, ties, cordwood, pulpwood, stave bolts as well as logs are cut by the settlers and hauled out to the railroad or the lake, where there is a ready market at prices which give the settler some capital for developing his land, erecting buildings and purchasing stock.

Clearing, especially where the timber consists of poplar, is not at all expensive since grubbing is unnecessary. The stumps of poplar rot in two or



STATE FORESTER COX, "TOGO" AND THE SLED ON THE ARM OF BELTRAMI PRAIRIE.

three years so that they can be plowed out. Some of the settlers have fields of 40 to 100 acres under cultivation. The haul to Kelliher on the M & I. Railroad is from 5 to 12 miles, and there are several points along this shore of the lake where steamers call and produce may be shipped to Redby, the terminus of the M R L & W. Railroad.

This hardwood district east of Upper and Lower Red Lake would be an excellent place for stave mills, box factories, spool factories, excelsior plants, etc. The supply of material is ample, cheap and of the best quality. Manufacturing concerns like these would be of great benefit to the settlers and would bring about a more rapid development of farming and especially dairying, for which the district is admirably adapted. Within five or six miles of the lake there is an entire absence of summer and early fall frosts, due to the influence of such a large body of water. On this account there is a probability that fruit raising may become profitable here.

The Peninsular, between Upper and Lower Red Lake, in area about seventy square miles, is a sandy and gravelly ridge, covered with a beautiful Norway pine forest, and should be made a national forest or park.

Red Lake deserves to be much better known than it is. With the exception of Lake Michigan, it is the largest body of fresh water wholly within the United States. It covers an area of nearly 400 square miles.

Red Lake is remarkable in that despite its immense size, it contains no islands and that its shore is practically a continuous sand beach. The deepest portions of the lake are only about thirty-five to forty feet, but the bottom is so uniform that a sailboat or steamer can take a straight course without danger of striking reefs or sand bars. The surrounding country is even in topography and breezes on the lake are dependable so that this splendid body of water offers perhaps the best opportunity in the world for yacht racing, ice-boat racing and similar sports.



FOREST PATROLMAN SMITH WHO KNOWS THE UPPER LAKE COUNTRY.

Red Lake has no muscallonge but is well supplied with white fish, pike and other food fishes. The fishing industry has not been developed. Perhaps this is well since it will now be possible owing to an interest in conservation, to provide for proper supervision of the fisheries when they are developed to see that favorable conditions are maintained for the reproduction of the fish and continuance of the industry. It would be much more sensible for the government to encourage a conservative development of the fisheries of Red Lake and thus lead the 1,200 Indians living on its shores to become self-supporting through a line of work for which they are suited than to spend untold sums trying to make farmers of them.

The fish of Red Lake are worth far more to the Indians, if the government only thought so, than all the pine on the reservation and all the land which may ever be allotted to them. The present Reservation includes the coun-

try on the south and west sides of the lake, together with the pine covered peninsular and embraces about 400,000 acres.

At the time we were "mushing" across the broad expanse of the upper lake the snow-shoe rabbit was migrating, and hundreds of the little creatures were out on the crusted snow of the lake. Evidently during these migrations they are not in the habit of turning aside for lakes even if, as in this case, they could not possibly see the farther shore.

The distance across was more than one night's march for rabbits and they were accordingly compelled to squat on the snow and make themselves as inconspicuous as the conditions permitted with nothing to hide behind. Owls of various kinds were abundant along the north shore of the lake and there were numerous evidences of where they had made meals of the unfortunate rabbits. No doubt that shore is an excellent hunting ground for owls

and foxes since they need only await their prey and catch it in the open. Small birds in their autumn migrations frequently perish in attempting to cross the lake in the face of cold winds and are found washed up on the shore in large numbers.

Red Lake may eventually be used as a reservoir to control the waters of Red River, and prevent the spring flooding of much good land between Grand Forks and Winnipeg. Red Lake River, through which the waters of the lake find their way to the Red River of the North, is no mean stream, having been used by steamers of considerable size freighting from Grand Forks, a distance of about 150 miles. There are rapids furnishing important water power at Red Lake Falls and Thief River Falls.

The streams entering the lake are Black Duck River and Battle River, at the east end, and Mud River, Bigstone Creek and Sandy River on the south side of the Lower Lake; Tamarack, Moose, Big and Little Deer Rivers, Mahnomen River and Shortley brook on

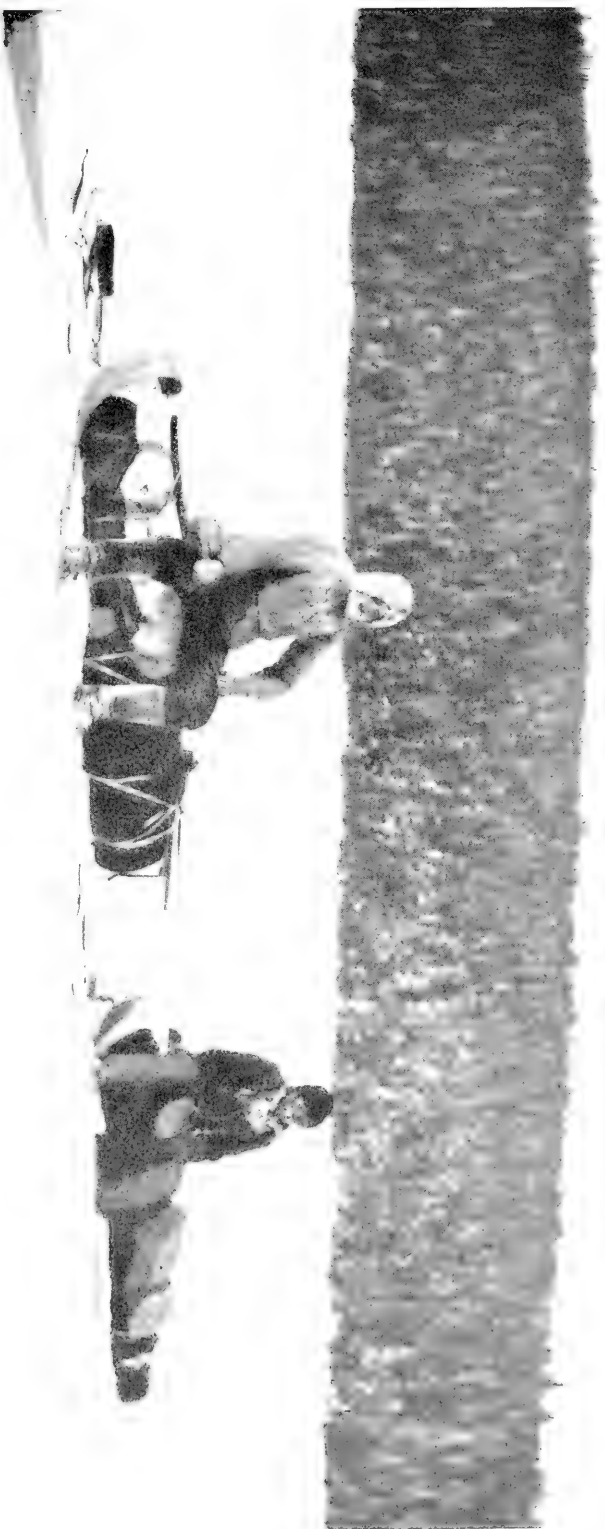
the North Lake. The Tamarack, Black Duck and Sandy drain rather large areas; the other streams are short.

The Indians living on their reservation, which includes the south and west sides of the lake, are not so badly demoralized as other tribes within the state. They have come less in contact with the white man and therefore retain more of their old characteristics. They are a pretty trustworthy lot of Indians, showing some industry when given work at all suited to their nature.

It is needless to say that farming does not appeal strongly to them, and I question the wisdom of the government's costly efforts to make them till the soil. Some of them, generally the squaws, do raise gardens, but the male members of the tribe prefer the lumber woods and the log drive, some spending their summers at the fisheries on Lake of the Woods and making good wages. For this reason I want to repeat that with proper supervision of the fisheries which could be developed on Red Lake these Indians might be-



THE FAITHFUL COMPANION OF MANY WINTER TRIPS THROUGH THE WILD COUNTRY.



THE KIND OF SLEDS USED IN THE LONG TRIPS OVER FROZEN WATERS FROM ONE CAMP TO ANOTHER.



BREAKING A TRACK THROUGH SPRUCE AFTER A HEAVY SNOW STORM.

come self-supporting and useful citizens.

We now come to a particularly interesting part of our trip, namely, the crossing of the so-called "Great Muskeag."

After leaving the north shore of Upper Red Lake we went through a narrow belt of hardwood and spruce, emerging into tamarack, which soon gave out, and we were on what has been indicated on map after map as an expanse of open swamp. This has deterred everyone from venturing into the district.

As a matter of fact a large part of the country from Red Lake to the

Rapid River was wet until the last four or five years, but a change has taken place which is exceedingly important to Minnesota, for it has resulted in giving the state another "Red River Valley." Perhaps due to the driving of the hundreds of millions of feet of timber through the outlet of Red Lake and down the river, the channel has been deepened and the lake permanently lowered. This has reduced the water level in the former open swamp to the north and made of it a prairie.

I now propose naming it "Beltrami Prairie." It is a wonderfully rich piece of country with a deep black soil capable of producing prodigious crops and



THE KIND OF WINTER SHELTER USED IN THE NORTH COUNTRY AND WHICH MAY BE MADE VERY COMFORTABLE.

in places ready for the plow without further drainage. With state ditches, some of which are already approved by the Drainage Commission, there will be less danger of flooding than in what are considered the best portions of the Red River Valley. Much land on the borders of this rich district north of Upper Red Lake has been taken up as homesteads recently. But to my mind the best of it still remains to be homesteaded, and the man who is willing to undergo some hardships and remoteness for a year or two will be well repaid for making his home in the Upper Red Lake country.

We found travel easy on "Beltrami Prairie." Snow-shoeing was good and a fair distance was made each day. Prairie chickens were very plentiful, both the pinnated and sharp tailed species being observed in big flocks. The tracks of foxes and coyotes wound here and there, but it was not until nearing the heads of creeks which drain to the Rapid River that we observed tracks of big game, then moose tracks were abundant and we started one which was feeding on the willows along Miller creek. The caribou which range in this locality had gone east toward the headwaters of the Tamarack, so we did not see any of them on our trip.

The existence of caribou here has been known for years, but owing to the closed season and to the remoteness of their range, few of them have been killed by hunters. The Indians have shot a few, but since the swamp has dried up and the mother caribou no longer find safety during calving time on little islands which used to dot the great swamp, the wolves now get practically every calf.

After crossing "Beltrami Prairie" we entered the hardwood, spruce and cedar forests along the Rapid River, and its tributaries. This is a district of rich soil and heavy growth. Whatever is found growing on a particular piece of land seems to be producing all it can. The trees are tall and the timber yields heavily. It would be difficult to find better stands of poplar, spruce or cedar than are to be seen

here. There is also considerable ash, birch and soft maple.

Down the rapid, half way to the "forks," the settlement begins in earnest and from there on forty miles down to Clementson, where it empties into the Rainy, settlers' cabins and clearings line the beautiful banks.

Wherever crops have been raised in these clearings the yield and quality have been wonderfully good. Wheat, oats, barley, clover, timothy and root crops yield as well as anywhere in the state, and even tomatoes seem to be a sure crop, which is an indication that summer frosts are lacking.

Between Baudette and the Rapid River settlements there is a large area of fertile land, much of which had a heavy stand of spruce, cedar, tamarack and birch, until the fire of 1910 swept that locality. There are still patches of green timber, but most of the forest was killed. Some of the land is not difficult to clear and nearly all of it is good farming land when once cleared. A good deal of it has been cut over for pulp wood and cedar. The land was practically all taken up primarily for the timber and can now be bought at very low figures by people desiring it for farms.

Along Rainy River there is a beautiful country. The soil is not quite as rich as on the Rapid River, but is nevertheless real good soil. Moreover, the transportation facilities are already fair and markets good along the Rainy. On the Canadian side there are comparatively old settlements and the farmers are well-to-do. They have not known drouths, summer frosts or other causes of crop failure in thirty years. The proximity to Lake of the Woods on the northwest, Rainy lake on the eastward and Red Lake on the southwest, temper the winds and keep them above the point of frost danger through the growing season.

The man who watches the Rainy River country for the next ten or fifteen years is going to see a surprising development or I am badly mistaken.



A VIEW OF ONE OF CENTRAL PARK'S LAKES.

CENTRAL PARK, NEW YORK: A WORK OF ART*

By HAROLD A. CAPARN

THE designers of Central Park decided that the best expression they could bestow on it, that which would be of the greatest value to the greatest number, was one which would recall the feeling of the woods and meadow, rocks and water, of rural scenery. This would give the relief of suave surfaces of ground and mobile masses of foliage to minds and bodies wearied with the endless rectangularity of the streets. So they laid out a scheme, simple in its main structure, though looking complicated enough on the map, consisting of a road running all around the park, with certain cross-roads to provide for the east and west traffic. Four of these are the famous sunken roads which are said to have been the means of Olmsted and Vaux gaining the prize, and which they so skillfully treated that you can seldom see them unless close upon them, and

often cannot see them at all even when crossing them. The reason for concealing them was that they were intended for business traffic, which should be kept out of the park. On this road plan is superposed a system of walks crossing the park in many directions, leading to and helping to create an endless variety of scenes of grass and trees, lakes and rocks. Several sheets of water of considerable extent occupy the sites of former swamps, the muck of which was used to enrich the lawns and woods. These walks penetrate and enclose pieces of ground of the most varied shape, size and expression. Yet all are connected so admirably that one passes insensibly from one to another, and there is nowhere apparent the shock of arrested dimension, of finality that is essential to the expression of architecture but quite foreign to the intent of informal design. Everywhere

is displayed the utmost resource of the artist and variety of treatment, as consistently as though the true solution of the problem of each part had been found without effort. When conditions are at their best, after rainy weather or in the early morning or evening, there is a wonderful air of calm beauty pervading it all, so that one marvels more and more that such a thing with such a sentiment should exist in New York City.

Now, if you travel in any rural district, you will find in all directions the raw material or the motive from which Central Park is made. There will be trees and bushes, meadows and rolling ground, buildings and bridges, rocks and water, each in its way more or less beautiful because of the beauty of many or most of the details, the cheerfulness and vitality of it all: in short, because it is the country, as big and free as all out-of-doors. But, though there is much pictorial beauty, it will be seldom that you find a scene, small or large, that composes well. By composing well I

mean not only showing orderly arrangement, just proportion, good lines, and so on, but conveying the impression of a complete picture, "carrying through" as it is called. This is the quality that conveys an impression of unity to the mind, that gives the effect of simplicity to the most complex design, and may be seen in a book cover, a Corinthian column or a church façade. Remember, I am not speaking of the untouched country, but of the country altered by man mainly for the purposes of agriculture. There will be a piece of meadow with trees on it, but they will be too scattered or too crowded, or a border of them will have a gap in it or a group extend too far or not far enough. A piece of ground of naturally good shape will be partly in meadow and partly plowed up, and a wall or fence will divide it just where it is best placed to interrupt the flow of line of the earth's surfaces. Houses, barns and other buildings will be scattered wherever the convenience of their builder dictated, but with little or no



A WINTER SCENE IN CENTRAL PARK.



A DELIGHTFUL PATHWAY THROUGH DENSE FOLIAGE.

thought to their effect as part of the landscape. The whole of this could be made into a coherent composition if anyone would pay for it, and so could each scene that the eye can separate for itself. This is what is done in Central Park; each successive part into which the uneven surface naturally resolves itself is treated according to its own suggestion, with thoroughness and reserve. Buildings and other subordinate objects are carefully set where they will do least harm to the general composition. The ragged countryside planting is arranged in groups or masses or borders with due regard to the habit of the trees, texture, and color of foliage, skyline and so on. For the rough or divided surface of land is substituted the smooth and continuous lawn, displaying the best contours of the ground, and preserving them unbroken to their logical end. In fact, an informal park is mostly constructed of endless variants of these two features of lawn and planting, of open spaces surrounded by covered ones, as a room or a building is composed of voids and solids.

We should not forget that this composition of voids and solids, of open lawn and enclosing foliage, is not a natural thing, is not even an imitation of nature, as it has been so often called; even its prototypes, the meadow and woods, are not natural. The meadow is browsing land cleared and cultivated by man, and the woods themselves, indigenous though they may be, have their extent and outline from the axe of the farmer. Then what of the lawn set in artificial planting, it may be, of exotic trees and bushes? It is but a paraphrase, a conventionalizing of another artificial thing, and is itself as artificial or constructed a thing as any building or statue; in fact, it resembles the works of nature, much as a statue or painting resembles its original. Yet the general impression conveyed by a well designed, large city park is that of being in the country.

If it is desirable to produce the impression of being in the country, one would expect that the easiest way would be to imitate the country as closely as possible. But the curious

contradiction here is that, if we did, we should not produce the effect of being in the country at all. If we were to cover the area of Central Park with fields of corn and potatoes, with grazing land, casual buildings, woods, swamps, and crowded or scattering trees, it would merely look like a piece of unkept city land which remained open because it was held at too high a price, or because it belonged to the estate of someone deceased, and could not be sold. Even if you should arrange your agricultural features with regard to their artistic effect, like the "ferme ornee" of Shenstone, you would not get the feeling of the country. The city park is not an imitation of the country, it is a paraphrase of it; and if you want to create in the city the country feeling, you must not imitate the country, you must paraphrase or conventionalize it. You must reproduce not its accidents and incidents, its roughness and casualness and disorder; you must reproduce its essentials, its openness, its vitality and its verdure, its contrast of the surfaces of the ground and the masses of woods, of the light greens of the grass and the dark of the trees, their freedom and grace and benignity.

Central Park, in view of its extent, its cost, its location, is perhaps the most important and interesting thing of its kind in the world. It is one of the best-loved and one of the worst-hated public recreation grounds in the world. It is admired without reserve by vast numbers of people of all kinds, and it is condemned with as little reserve by some others. Among its friends are east-side Hebrews, west-side millionaires, New York's blue blood, aliens who came over in the steerage but a few months ago, and everything in between. Among its enemies are the type of self-styled "practical" man who cannot see that a piece of city land is doing any work unless it is covered with a pavement or a building, some real estate men who see fine possibilities of a boom in their business were the park cut into lots, and a certain class of artists who see no merits in its present plan, and think it should be



ONE OF MANY BEAUTIFUL EFFECTS OF LIGHT AND SHADE.

laid out in some other style. These artists say that, being a long and relatively narrow rectangle set in a system of parallel lines, its layout should also be rectangular, that we ought to have something like the Champs Elysees or the avenues at Versailles. They say that it should have a scheme in scale with its size, that you should be able to see through it from end to end and, in fact, that there ought to be something grand and vast, instead of the rural prettiness they see in it at present. They decry the meandering lines, the indefinite surfaces and vistas, that everywhere abound. In short, they find in it little but irresolution and aimlessness, and an expression which excites in them only the contemptuous verdict that there is no "design" in Central Park.

We need not concern ourselves with the naive utterances of the "practical men" or the real estate operators, but the views of some of the others touch us very closely, for among them are some of the men in our own world of artists whom we most respect, and in whose class we all hope to be. But, if you examine their criticisms of Cen-

tral Park, you will find them all merely expressions of personal opinion, not of natural laws or canons of art. You will find that they may have been misled by prejudice for or against one style of design, or by an imperfect understanding of one style of design—the informal. They may assert that a rectangular piece of ground should of necessity have a rectangular plan, which seems about as reasonable as that a rectangular frame should of necessity enclose a picture of rectangular pattern; or that the veining in a marble panel must properly be perfectly symmetrical, like a piece of floor cloth. The boundary lines of Central Park were laid down, not by nature or the conditions of the problem, but by the city engineer. Why should they necessarily control the design? As a matter of fact, once inside Central Park, it is as a rule hardly possible to tell what or where the boundaries are; and when you can see a boundary it is a row of high buildings so far away that they seem to be in no conflict with the park scenery; and probably from no point within is it possible to discern the en-



ONE OF THE MANY PLACES WHERE CHILDREN LOVE TO PLAY.



A SPARSELY WOODED SLOPE WITH DRIVEWAY IN THE BACKGROUND.

tire size and shape of the park. In short, once within, you lose all sense of the boundaries, and are affected only by the park itself. It seems to me that there could be no such grateful relief from the rigid rectangularity of the New York streets, nothing in so pleasant contrast with the eternal parallelism of the city plan, as the indefinite lines and surfaces of the park; its undulating lawns with foliage, the contrasted verdure of its grass and trees and bushes. When we get into a large park, we surely want to escape straight lines, not to discover new ones; to find vegetation in its natural freedom, not shorn into the forms of stone and wood. Probably nothing could be more fortunate than that its principal park in the heart of Manhattan Island should be composed of lines and forms and textures that recall the best of the country scenes of pasture and wood and water, and provide continual refreshment and solace for those wearied with the ruth-

less lines and angles and bricks and mortar of the surrounding streets.

I am inclined to suspect that some of the abuse of the plan of Central Park arises from its appearance on paper, at first glance having little relation to the system of streets around it. But it is dangerous to be misled by the picture plan, with its resolute straight lines running off into impressive infinity, and the whole merging into the nebulous unknown. I admit, at once, that the plan of Central Park on paper looks about as vague and shapeless a thing as I know, but then so does a study in anatomy; and, whatever one may think about the park plan, one will certainly not deny that the anatomical plan represents a thing quite perfect in design from beginning to end with complete connection and coherence between all its parts and with all of them mutually interdependent. The structure of the human brain shows no regard for its appearance on a medical chart, yet

its design surely shows as comprehensive adjustment of parts to a complete whole as we can conceive. So it is with an informal landscape design; so long as it is logically conceived and consistently maintained, so long as it "carries through" not only in feeling but in actual structure, and so long as it serves the purposes, practical and esthetic, for which it is intended, it matters little what it looks like on paper.

This brings me to another charge against Central Park: that it is a succession of separate features pretty enough in themselves, but not sequential nor connected by any big scheme worthy in scale of the size of the tract, not such as need the serious attention of an artist to compose. If for the abusive word pretty you substitute "beautiful," half the sting is taken from this severe arraignment. Again we have an adjective which is a matter of personal opinion. To me the scenes of Central Park seems as beautiful as any I know of their kind. Their relation to each other is so well managed that you cannot find where the line of separation occurs, but pass imperceptibly from one to the next. It is no reproach to a large building that it consists of many separate and relatively small apartments whose connection with each other and with the whole and whose importance as part of the whole cannot be seen, but can only be demonstrated by the convenience and efficiency with which they serve the purposes of the whole. Every building cannot be a church or dance-hall, a building of one room; we must have our business blocks, our hotels, our courthouses, and so on, which do not admit of interior grandeur in scale with the mass of the structure. So with a park; it may serve more and better purposes by being a succession of scenes adjusted to the natural contours, aptly united and rationally separated, than by being constructed on a single motive apparent at a glance. They who find a lack of simplicity and dignity in Central Park forget that it was made not only for those in it, but for those over it, who can look down on it from the sur-

rounding buildings, the upper stories on Fifth and Eighth Avenues and Fifty-ninth and 110th Streets. Before them opens a prospect of massed foliage, with openings of green turf, and from some parts of shining water, perhaps as superbly simple as any formal scheme that could be imagined. The fact is, a good deal of this criticism rather savors of ill-nature and calling names; a thing of which artists, who all live in glass houses, should be very careful. The next stone may be thrown at your house or mine, and we cannot get it mended because we cannot prove either that we are right or that the other is wrong; we have no means of demonstrating the beauty or justness of our work as a building inspector can demonstrate good or bad work, or as a watch can be shown to be well made, to anybody's satisfaction, by merely keeping time. We all depend for approval or disapproval on the body of opinion, and nearly all criticism can be boiled down to "I think that" or "it seems to me." I think that the design of Central Park is, all things considered, and allowing for certain imperfections, very good; but I cannot demonstrate its excellence except in the same way that I can demonstrate the excellence of design of Michael Angelo's Last Judgment, or a landscape of Corot.

Inasmuch as most artists nowadays are educated in schools of art, and emerge therefrom supported by the confidence and authority of their school, it is usually assumed that such training is necessary to produce an artist. But in all arts there have been men of eminence without conventional training, and notably so in landscape design. No more striking instances of the self-evolution of natural gifts can be found than in the designers of Central Park, Frederick Law Olmstead and Calvert Vaux. Vaux was an Englishman who had turned to landscape design through natural preference, and the extent and value of whose work was never particularly known, and perhaps never will be. Judging by the quality of what he did alone, he was one of those who have found what they are sent into the world to do. As for Olmstead himself, it is

often assumed that he entered on the construction of Central Park as an inexperienced amateur, and succeeded by a miracle. But he had a strong natural inclination for such work. He had traveled through Europe, and studied its scenery natural and artificial. He had traveled 5,000 miles on foot and horseback, to observe the scenery of his own country; and, in fact, for fifteen years he had steeped himself in the works of nature, and of art as applied to nature, and was so full of her precedents and suggestions that he could discover and explain the sentiment inherent in any piece of ground, and propose a fitting method of treatment. He had also had not inconsiderable experience in actual constructive work, and, though his training was not that of the schools, it was perhaps in reality as thorough as that of anyone who has prepared himself for the practice of an art, for genius will occasionally do better and travel farther when left to its own guidance than ordinary talent directed by others. And, after all, his education was not different in principle from that of other art students. They study the work of their predecessors and exemplars, the works of nature and man's interpretation of them, until they have amassed a store of impressions and experience, from which they can draw the power to express what is in them when opportunity arises. Their training differs from Olmstead's only in that their choice of examples is guided,

and their conclusions from them continually criticised, by their teachers. He made his own choice of subjects, and drew from them his own conclusions unaided. It is worth while to linger a little on this man who, by his career and his achievements, was one of the very greatest of American artists. His personality, his career, and even his writings, bear many striking resemblances to those of Humphrey Repton in England, in the previous century, whose books are probably the most valuable contribution to the literature of landscape design in existence, at least in the English language.

The value of all this discussion is not very great, except as it supplies us with answers to hostile criticism, which sometimes proceeds from apparently high authority, and aids us in focusing and strengthening our own impressions. The fact remains that few people can enter Central Park without becoming sensibly happier, that it produces to a greater or less extent in those who enter it such sensations as its designers wished. And, surely, for a man to be able by his creation to arouse in innumerable others who come after some such sense of beautiful in nature as has inspired himself, to instill into them something of his own spirit, is a great achievement; and the means by which he does it is entitled to be termed in a very high degree a Work of Art.

*By courtesy of Landscape Architecture.

The Western Forestry and Conservation Association, representing the five timber Pacific States, sets the standard for forest fire prevention as well as forest fire fighting. Among its methods is the circulation among the people of hundreds of thousands of pamphlets, play-cards, stickers and warnings, which are sometimes appeals, and sometimes warnings, as to the importance of the forests through the community at large and what a loss would be involved in their destruction.

NINE GRADUATES AT MONT ALTO

The graduating class at the State Forest Academy, Mont Alto, Pennsylvania, which held commencement exercises on August 14, comprised Walter R. Evans, Nathaniel B. Funk, Joseph R. Hagentogler, James A. Irvin, Charles R. Meek, Maurice Mustin, Milton O. Robinson, James B. Ryon, and George W. Sheeler.

MASSACHUSETTS FORESTRY WORK*

STATE FORESTER F. W. GRANE, of Massachusetts, is satisfied that his department is accomplishing gratifying results and doing as much as the State appropriation permits. In his eighth annual report recently issued he describes in detail the year's progress. He says in part:

It has been the constant aim of the State Forester to establish a forest policy worthy of Massachusetts interests. Year by year, through the splendid support given by our public-spirited citizens and various organizations, we have made constant progress.

In submitting this, the eighth annual report, it is certainly a great pleasure to be able to state that, through the generous consideration of the last General Court, we have been able finally to perfect a State-wide forest fire policy that promises very great economy. With an up-to-date patrol and look-out system for forest fires, backed by a strong and efficient town and city for-

est warden unit of organization, already well established, together with the perfecting and adapting of previous laws, we now can boast of being in a position adequate for natural growth and development.

I am frank to say that there never has been a more wholesome, co-operative interest shown toward this department than during the present season, and this, too, following an apparent misunderstanding on the part of a few of our legislators last session, who finally gave the department their support.

I firmly believe that ultimately Governor Foss's first year's administration will be as noted for its establishment of a State-wide forest fire protective policy as any legislation enacted during the session. When we once can assure our people that forest fires can and will be controlled, there will be little trouble to interest capital in reforestation. With fire protection and a rapidly increasing interest in modern forestry, which no one can deny is prevalent even at pres-



A PORTION OF THE STATE FORESTER'S NURSERY AT AMHERST. THESE ARE THREE-YEAR-OLD WHITE PINE SEEDLINGS THAT WILL BE SET OUT PERMANENTLY NEXT SPRING.



A VIEW FROM THE LOOKOUT STATION FOR FOREST FIRES ON GRACE MOUNTAIN, IN WARWICK. WACHUSETT MOUNTAIN IN THE BACKGROUND, ABOUT THIRTY MILES AWAY.

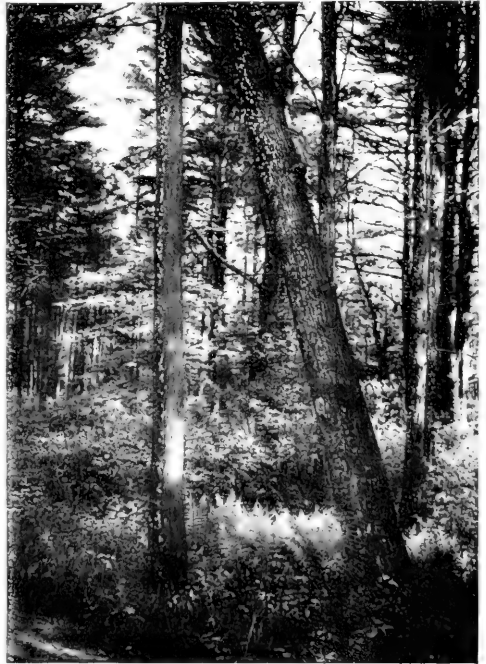
ent, it only remains for the casual observer to predict what we may be able to accomplish in Massachusetts.

The various lines of work in this department have been explained quite fully in past reports, and it is necessary only to state that the work throughout the year has even surpassed any other. The requests for examinations and advice have been far in excess of our ability to meet them with our present force. Forestry literature has been in great demand, and several bulletins have been revised and reprinted, besides much new material sent out. Lectures and demonstrations have been constantly requested, and as many given as conditions would permit. Forest laws and fire-warning posters have been posted fully by our wardens throughout the State.

Towns generally are awakening to the necessity of being equipped with modern fire-fighting apparatus if they are to encourage forestry in their midst. The towns with a valuation of \$1,500,000 or less are taking advantage of the State's offer of assistance, and it is predicted that the usual appropriation by the State of \$5,000 will be utilized immediately following the spring town meetings. As usual, those towns with equipment and organization have kept

forest fires under control, while other towns have suffered.

The work of reforestation continues as popular as ever, and I am con-



BROWN-TAIL MOTHS THE MORNING AFTER THEY HAD BEEN ATTRACTED TO THE ELECTRIC LIGHT, ON LAKE SHORE AVENUE, NORTH SHORE.



BACK FOREST WHERE NO WORK WAS DONE.
TREES STRIPPED OF THEIR LEAVES IN
JULY, AS THOUGH IT WERE WINTER.

vinced that if the Legislature could see its way clearly to enlarge greatly the present appropriation for this work, we could readily plant many times our present annual acreage. Our reforestation act is unique and is proving a success. The work in this line will be far better appreciated in a few years, when the young trees have grown to a more desirable size.

The gypsy and brown-tail moth work, while still a very perplexing problem, is better understood and more intelligently combated than ever. Our people are finding out that the best way to fight these pests is to take advantage of the advice and assistance that experience has taught us. This office is in a position to advise and assist in this work throughout the infested territory. The division superintendents are men of ripe experience, and the local superintendents are more efficient and in better control of their conditions than ever before.

If, as we now have reason to believe, it is soon to come to pass that the

United States government will take over the parasitic work which the State has financed up to the present, and also assume the work of controlling the spread of the moth, then our State work will resolve itself down to internal self-preservation in the present infested territory. With this arrangement, I believe the State ought to combat the enemies satisfactorily with decreasing expenditures. Many cities and towns once badly infested are at present, through State aid, in good condition, and now should become self-supporting, and it is the department's purpose to so direct the work that the annual drain upon the State treasury may be lessened as much as possible.

Massachusetts has been the motive force in combating these pests up to the present. In recent years the insects have spread into adjoining States, where little attention to their control has been given, so that now the problem is one of protecting the nation.



SPRAYING IN THE FORESTS, WITH 1,500
FEET OF HOSE AND A PRESSURE OF 300
TO 350 POUNDS AT THE NOZZLE. EX-
PENSE NOW REDUCED FROM OVER \$40
AN ACRE TO BETWEEN \$6 AND \$10.



GYPSY MOTH CATERPILLARS DYING FROM THE WILT DISEASE, OR FLACHERIE.

It is believed that the national government can ill afford to take other than a more progressive stand in this work. A million dollars a year at present will go farther than a much greater sum later on. It is reasonable to hope that the parasites, diseases or natural causes may work to the detriment of these insects, but there are many chances of other sections of the country becoming infested and thereby working great destruction before results from these are realized. At present the only practical means of protection from the spread of this pest is through spraying and other well-known mechanical methods.

The reforestation work has been carried on this year along the same lines as formerly, and the increasing interest of lumbermen and landowners proves it a policy worthy of enlargement.

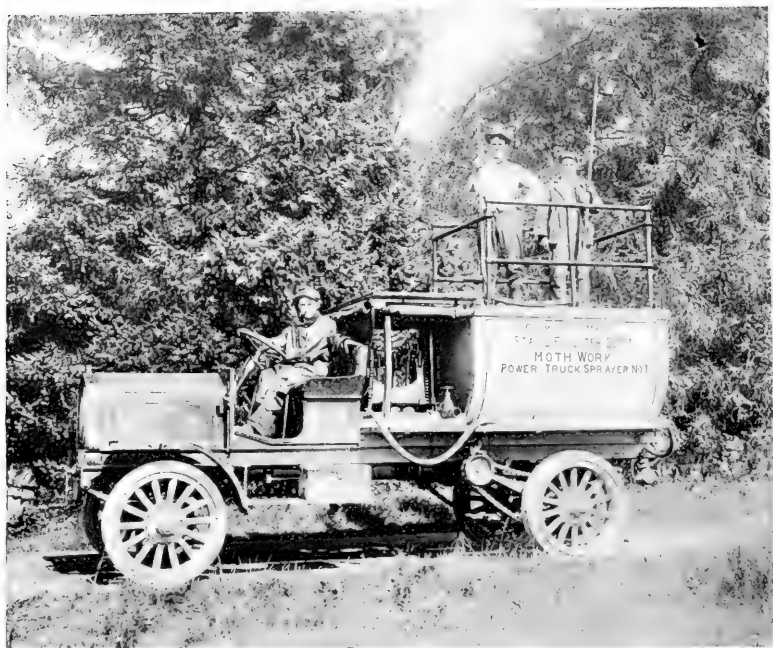
The plantations put in during the spring of 1909 and 1910 are showing up well, and growth in many instances on plantations made with transplant white pine being as much as 8 to 16 inches this last season. There was practically no loss this year from dry weather affecting these plantations, proving that when once well started

they are not liable to be affected by climate conditions.

Plantations made this year in one or two instances were quite badly affected by the exceedingly dry season, as might be expected.



THE POWER-TRUCK SPRAYER IN ACTION, THROWING TWO STREAMS AND TRAVELING AT THE RATE OF 4 OR 5 MILES AN HOUR.



A CLOSE VIEW OF THE NEWLY INVENTED POWER-TRUCK SPRAYER. SAME POWER AS THE ABOVE, BUT DOES AWAY WITH HORSES AND DRIVER, AND THE ENGINEER BECOMES THE CHAUFFEUR. TANK AND PUMP ARE EASILY REMOVED AND THE TRUCK THEN IS USED THE SAME AS ANY TRUCK.

Increased interest has been shown by parties looking over plantations with the idea of making small plantings on their own land, and the large number of inquiries shows that this work is awakening great interest.

This year 860 acres have been planted, and deeds for 500 acres additional have been recorded which, from lack of sufficient appropriations, we were unable to plant. There are also now offered 700 acres more. The amount of work possible is governed entirely by the appropriation, and it would seem advisable for the State to enlarge this work.

It has been impossible up to the present time to raise sufficient stock to take care of the planting done under the reforestation act, the department being forced to purchase a large number of seedlings from outside nurserymen at a much higher price than if raised on our own land. It has, therefore, been deemed advisable to enlarge our nursery from time to time, and we are now in a position to supply from our own

nursery sufficient stock for our planting work next spring.

It is with considerable reluctance that each year we include in our annual report a chapter on this painful subject,—painful, because forest fires are the greatest obstacle to the advancement of practical forestry throughout this Commonwealth. As long as this State continues to burn over from 35,000 to 100,000 acres each year, just so long will forest owners hesitate to make provision for natural reproduction, to plant trees, to make improvement thinnings, or to do other work looking to continued forest production.

The season just ended has undoubtedly been the worst fire season this State has experienced in many years. When we stop and compare figures with the records of the past three years we find that during 1908, 1909 and 1910 there was burned over throughout this State 116,976 acres, with a damage of \$600,017, and in the year 1911 our reports show 99,693 acres burned over, with a damage of \$537,749, nearly as



THE FIRST POWER-TRUCK SPRAYER EVER INVENTED. BUILT BY THE MASSACHUSETTS STATE FORESTER IN 1911 FOR SPRAYING IN THE GYPSY AND BROWN-TAIL MOTH WORK. THE WHOLE OUTFIT WAS DESIGNED AND BUILT FOR THIS WORK, AND PROMISES TO REVOLUTIONIZE THE QUESTION OF SPRAYING, PARTICULARLY ROAD-SIDE, PARK AND SHADE TREE WORK, IN COMBATING INSECT AND FUNGUS DEPREDATIONS. IT CAN BE USED FOR FOREST FIRE WORK AS WELL. THE SAME ENGINE THAT PROPELS THE TRUCK ALSO IMPARTS THE POWER FOR SPRAYING.

much as the three previous years combined. Estimating the forest area of the State at 2,500,000 acres, which is a very conservative estimate (and in order to reach this amount there has

been included all the scrub growth and old pastures), it will require only twenty-five years to completely destroy every acre of forest land within this State. 'Then what is the result? Sim-



THE STANDARD IMPROVED POWER SPRAYER, PLANNED AND BUILT BY THE STATE FORESTER.

ply this: not only are we compelled to go elsewhere for our timber supply, but we have created a condition which seriously threatens our future water supply, for it has been demonstrated by the greatest engineers in the world that forests play an important role in the regulation of rivers. They retain for some time the rainfall and lessen the violence of flood flow. Whenever forests have been destroyed stream flow has always become more irregular and floods have increased in number and violence. Therefore, is it not time the public were awakened and a more thorough organization perfected to avert these dangers?

The moth work has been under the supervision of the State Forester for the past three seasons. It has been his constant aim to perfect a "live-wire" organization. The department has received \$300,000 a year for the State work and \$15,000 a year extra for parasite work. This last sum has been largely expended under the direction of the United States government. For the expenditure of the \$300,000 each year for the past two years statements have been made in previous an-

nual reports, and the results of the present season are given in the following pages.

The expenses for supervision of moth work in two years were reduced from \$92,000 to \$36,000, and we believe the work is more efficient than ever.

What has been saved in supervision has enabled the department to do just so much more in cities and towns. With modern conveyances, as with the motor cycle and automobile, the whole problem of better supervision and methods has been solved. The improved spraying machinery and general equipment have revolutionized former practices, as the cost of woodland spraying alone was reduced from \$40 to about \$6.50 an acre. The burlap method of treatment is practically a thing of the past, except in certain cases. The same amount spent for spraying that was allowed for labor and burlap proves more effective in combating the moths.

At present we have a more definite State policy. The co-operative understanding between the State forces and the United States government officials



A NATURAL STAND OF WHITE PINE PROPERLY THINNED TO ASSURE GOOD GROWTH OF THE REMAINING TREES. IN THE TOWN OF BUCKLAND.



A PLANTATION OF WHITE PINE, THIRTY-EIGHT YEARS OF AGE, WHICH HAS BEEN THINNED AT A PROFIT, BELONGING TO W. G. KILLBURN OF LANCASTER.

is much improved, and it is believed promises well for the future.

During the fiscal year of 1911 the work on the State highways has been supervised by this office as in previous years, and we have given it our best attention. Not only has work been done against the gypsy and brown-tail moths, but we have also worked against the elm-leaf beetle in the moth-infested section of the State. The condition of the State highways at the present time is very much improved, as far as the gypsy and brown-tail moth infestation is concerned, and is not at all serious. A general infestation of the elm-leaf beetle occurs throughout the district on the highways, and in most places is serious, and will necessitate very careful spraying during the next summer season.

The amount expended this year is somewhat increased over the previous

year, owing to the fact that in 1910 the government took care of several miles of State highways which had been turned over to the care of the highway department during this year.

In view of the fact that a feeling has been entertained by some people in the State that infantile paralysis has been caused in some instances by arsenate of lead used in spraying, for the gypsy and brown-tail moths, the State Forester has caused a rigid investigation to be made in order to determine if there is any foundation upon which to base such fears. As a result of his research he is firmly convinced that the use of arsenate of lead has in no way been responsible for the existence of the disease, and apprehends no danger in the future from its use.

*By courtesy of the Massachusetts State Forestry Department.

GREAT LOSS FROM YUKON FOREST FIRES

CONSUL G. C. COLE, Dawson, Yukon Territory, Canada, reports as follows:

The timber referred to in the annexed paragraphs from the Dawson *Daily News* of May 28 is spruce. In fact, nearly one-half of the whole Yukon Valley, including that part in Alaska, contains a dense growth of spruce (of a size suitable for pulp and firewood only) which, if protected and utilized, is worth more than the valley's gold.

Timber destroyed by forest fires in Yukon Territory the last two weeks was worth millions of dollars. Men engaged in the wood business say it might be placed at \$100,000,000 or even more. A well-known Dawson wood dealer remarked:

"It is easy enough to arrive at the fact that wood destroyed was worth millions. The Yukon Gold Co. burns at its thawing plants \$500,000 worth of wood in a season of less than six months, yet the removal of that wood scarcely makes a noticeable hole in the forest. Dawson has been burning a large amount of wood for 14 years, and for a long time much, if not the most, of it has come from two gulches north of town. Those gulches have pro-

duced millions of dollars' worth of wood.

"These forest fires are sweeping over hundreds of miles of virgin timber. One patch reported burned south of Dawson is said to be 8 by 50 miles. In that area alone are thousands of gulches each containing tens of thousands of cords of wood. The loss there alone easily mounts into many millions. Some may say the timber burned was of no value because it stood where it would not be touched in many years, and possibly never. I say it is all valuable. The future of this region and the great outside demand which is calling for timber of the class we have here for pulp and other purposes must be considered. The fine timber of Yukon now destroyed by fire can not be replaced in 100 years. True, the large trees are fit for wood after the fire goes through, but woodmen estimate that a fourth of the good wood is consumed.

"Wood cut and placed on the river bank costs the chopper \$3 to \$5 a cord. To bring it to Dawson from near the White costs \$1.50 a cord. The large contractor tries to clear about \$1.50 per cord on wood delivered here. Running the risk of loss by fires of the kind now raging, he is taking great chances."



MAP SHOWING RANGE OF THE CHESTNUT TREE AND COMPARATIVE PERCENTAGE OF THE CHESTNUT BARK DISEASE.

FIGHTING THE CHESTNUT TREE BLIGHT

By OLIVER D. SCHOCK

THE Pennsylvania Chestnut Tree Blight Commission staff of employees numbers about two hundred persons, including the executive force, special investigators, district agents, field or county agents and scouts. With additional expert helpers their work is being done in a systematic and thorough manner, and it is believed that the immensely valuable native chestnut in Western Pennsylvania can be saved from extermination by the well-directed efforts of the Commission, together with the willing co-operation of timber owners and farmers.

East of the Allegheny mountain range and in eastern and southeastern Pennsylvania, the chestnut blight has been especially virulent, causing very heavy damages. Its spread during the past summer was both rapid and extensive, many new fields being reached by the blight spores. Just how these disease-bearing spores are disseminated

is the same puzzling question, and this subject is now receiving most careful attention. Whether the winds, birds, rodents or insects are responsible, or whether there is a joint responsibility on the part of these various agencies or elements, will soon be determined through the medium of the interesting investigations in progress at the University of Pennsylvania, Emile, Mount Gretna, Charter Oak, Martic Forge, Connellsville and other points of observation. The theory that the wind carries the infection quite readily has been advanced by those who noted the rapid increase in the number of infected trees that occupy an elevated plateau, located near Hamburg, Berks County, Pennsylvania, one observer expressing doubt as to the abundance of animal life in sufficient numbers to cause such a marked and rapid advance as was noticeable in that district.

The original Pennsylvania plan to stop the progress of the blight in its

westward stride has received much favorable support. A large majority of the field force in the employ of the Commission are working throughout the counties situated west of the Susquehanna River, where only occasional or sporadic infections are found. These are speedily destroyed and the owners instructed to watch carefully for subsequent infections. It is in this manner that the fungus had been kept under control, although not completely eradicated in the district designated. There are those who believe that the form of *Diaportha parasitica* found on the chestnut of western Pennsylvania counties may be less virulent than that prevalent in sorely affected eastern Pennsylvania counties, since it is less common, and apparently, more readily controlled. A stronger and more vigorous chestnut, under more favorable climatic conditions, soil, etc., may afford the power to add greater resistance to the attack of the fungus. Let us earnestly hope that Nature may come to our help speedily in coping with the chestnut blight, since tree-surgery, medication, fertilization and experimentation, generally, has been comparatively futile in those localities where, perhaps relief is most needed.

The Pennsylvania authorities believe in thorough work. Active scouting has been followed by such practical work as was deemed expedient. The press of Pennsylvania and adjoining States heartily supported the Commission, and the campaign of education and publicity met with warm approval. State, pomona and local grangers, agricultural societies, etc., manifested their willingness to co-operate in the task of saving the chestnut, and all of these organizations are doing splendidly for the cause. The boy scout-masters are also rendering valuable help, and their reports afford interesting reading, since the boys are in earnest and expect to win for their troop one of the several large flags that will be awarded to the scout organizations that can show the best practical results.

Another important branch is that of the utilization of chestnut. It is well known that chestnut trees killed by the fungus will deteriorate rapidly in quality, if not promptly marketed. It is for this reason that especial attention is being devoted to the subject of finding a market for the chestnut tree products. Large quantities of cordwood and other parts of infected chestnut trees will be sold to tannic-acid



SCENE SHOWING THE TOTAL DESTRUCTION OF CHESTNUT TREES
BY THE BLIGHT.



CHESTNUT TREE ON FARM SHOWING
EARLY STAGES OF BLIGHT.

factories, as the leading railway lines conceded special low rates for carrying blighted chestnut. The utilization question is being investigated most carefully and thoroughly. Another important movement will be to display specimens of the blight at the various county agricultural fairs this fall. These will be in charge of demonstrators who will fully explain the nature of the blight and suggest remedial measures so far as practicable. As the fairs of Pennsylvania during the season of 1911 attracted 1,522,500 visitors, this educational plan needs no further commendation. The farmers' institutes of the State will also afford an excellent opportunity to acquaint the people with the absolute necessity for waging a continued and united warfare against the blight if any chestnut shall be saved.

The Pennsylvania State Forestry Department has rendered invaluable assistance in combating the blight. The State owns 1,000,000 acres of forest lands, and the foresters in charge are making every possible effort to eradicate the disease. Their efforts have reduced the percentage of infection on State lands to a very small figure. A greater and more earnest interest in the work is needed in all the States threatened by the disease. Pennsylvania

does not believe in impossibilities, and will continue to lead in this laudable but difficult task of eradicating the blight.

General Manager Carleton stated that within two or three weeks every county of the commonwealth will be represented by active agents in charge of conservation work. General Superintendent Detwiler has concentrated a large amount of work in combating the progress of the blight upon western Pennsylvania counties, and is greatly encouraged by the prospect that the valuable chestnut in that section may be saved.

The man who wears shoes, reads the magazines, rents a house, uses the telephone or telegraph, goes trolley-riding etc., has a material interest in the eradication of this new but deadly forest pest, hence, the vital importance of general co-operation. As a producer of lumber, the native chestnut tree has an almost incalculable value, aggregating many millions.

Lastly in its list of many virtues is its immense value as a producer of food for man, sheep, hogs and other live



DISEASED TREE SHOWING
SHREDDED BARK AFTER TWO
OR THREE YEARS' INFECTION.



TYPES OF ORNAMENTAL CHESTNUT TREES KILLED BY THOUSANDS.
NOTE THE SMALL DISEASED BRANCHES. SCENE NEAR PHILA-
DELPHIA, PA.



YOUNG TREES SHOWING POSTULES ON SMOOTH
BARK AND TYPICAL SPROUTS.



POSTULES PRODUCING GELATINOUS THREADS
BEARING SUMMER SPORES (ENLARGED).

stock. The total value of the toothsome chestnut grown in the chestnut belt of the United States reaches almost stupendous figures.

The Secretary of the Pennsylvania Game Commission in his preliminary report for the present year refers to the threatened extermination of our native chestnut trees, through the ravages of the chestnut blight, and the serious effect that this loss of food for wild animals and birds would produce in this State.

Another authority declared that under proper care, our mountain lands could be made to produce a sufficient quantity of chestnuts to fatten all of Pennsylvania's hogs.

With ornamental chestnut trees situated on the lawns of country and

suburban homes that no money could buy, because of their historic associations, and allowing a minimum of only fifty cents for every chestnut tree in Pennsylvania, "there are millions in it," and it is no wonder that this State has taken a commendable lead in the endeavor to prevent the total extermination of the chestnut tree.

It is a vigorous campaign, but thus far Nature has succeeded in putting even the best scientists to the test in discovering a successful remedy. The pernicious San-Jose scale threatened to annihilate our wealth of fruit trees, but was conquered by the simple lime and sulphur solution; the codling moth and curculio have been subjugated, but this parasitic disease of the chestnut tree is baffling our vaunted skill, although, it is believed, only temporarily.

55,000 FOREST FIRE FIGHTERS.

More than a million miles of territory in comparatively sparsely settled sections of country will be covered daily by a forest fire preventive force of 55,000 men, as a result of an order issued by Postmaster General Hitchcock. These men are the rural and star route mail carriers, who are directed to co-operate with the forest rangers and State fire wardens in every way possible.

PROTECTING ELK IN WYOMING

WH. H. MILLER, of Cody, Wyoming, a recent visitor in Washington, said that Senator Warren has solved a problem which has been uppermost in the minds of the people of Wyoming for a great many years. He believes that the Wyoming senator has hit upon a scheme which will prevent the death of thousands of wild elk from starvation every winter, and, in addition, prevent these hunger-crazed animals from destroying the ranchers' haystacks and ruining their crops.

"For many years," said Mr. Miller, "the Jackson Hole region in western Wyoming has enjoyed the distinction of harboring the largest band of wild elk in the United States. The number has been variously estimated from 30,000 to 75,000. Each year has witnessed a diminution of the natural elk range on account of the influx of settlers, who fenced up the lands and planted large areas of crops. Each winter witnessed the elk driven closer to the ranches, and for the last five or six years the starving creatures have crowded through the ranchman's strong fences, laid waste his haystacks, and even devoured the rotting straw on the tops of his thatch-roofed sheds. Driven from the mountains by the heavy snows of winter, the elk were forced to the valleys to exist on swamp willows.

"To Senator Warren, of our State, belongs the credit for not only satis-

factorily solving this problem, but for evolving a plan whereby the elk ranges, long since barren, may soon become populated with sufficient numbers of elk to permit the hunter to have his annual fall sport within the confines of his own State.

"Senator Warren's plan contemplates the setting aside of a sufficient area in western Wyoming as an elk refuge where the animals cannot be hunted and where they may be easily fed during the severe snowstorms of winter. Each year a certain number of elk is to be shipped to ranges in other States until the number in the Jackson Hole region has been reduced to the carrying capacity of the range, after which only the increase will be taken away.

"Without disclosing the full scope of his scheme, Senator Warren has gone ahead working out its details and proving by actual demonstration the practicability of the plan. He first secured an appropriation of \$22,500 last winter, which sum was to be expended in caring for the elk and experimenting for permanent relief. As a result of this appropriation, experimental shipments of elk were made from Jackson Hole last winter to the States of Oregon, Colorado, Utah, Montana, and Washington. The shipments were successful, and the animals, turned loose on new ranges under proper protection, thrived."

A BOOM IN LUMBERING

American manufacturers of sawmill and woodworking machinery will be interested in the intense activity that prevails in the region directly adjoining the Ural Mountains, Russia, where promoters have turned their attention toward the unexploited riches of the place, and recently a number of companies have decided to work the immense timber areas on a share-holding basis. Many of the old firms have become share-holding companies, and others are forming every day. It is intended to develop the timber trade by the employment of up-to-date machinery. There is also a proposition to construct a rail line to convey to the coast the timber from the lands belonging to the Government in the Province of Turinsk.

BOY SCOUTS OF MICHIGAN

THREE thousand boys, marshalled into thirty companies of Forest Scouts, with the motto, "Keep the Right Trail," are now watching, with trained eyes, throughout the State of Michigan for forest fires, and are prepared, when any break out, to lend their aid in fighting them. They are under the banner of Michigan Forest Scouts, are learned in woodcraft, know how to fight forest fires and are of valuable service in preventing fires.

Michigan is the first State to put the Boy Scout movement to a practical test in this manner.

The suggestion came from Governor Chase S. Osborn. Early in his administration he suggested that the Boy Scout movement in general amounts to but little except a pastime for the youngsters. He suggested at the same time that the movement could be turned to practical advantage to the State and to the boys themselves. He proposed the organization of the Michigan Forest Scouts, composed of the boys of every school district in the State. He proposed that they should be organized into companies under officers of their own selection and working in connection with and under the direction of the Michigan State game and fish and forest warden's department become of practical service in preventing the forest fires which have annually devastated the State.

The suggestion was made to William R. Oates, the game, fish and forest warden of the State, and C. A. Palmer, the State fire marshal. They immediately seized the idea and Mr. Oates has now organized the service, which is already an important and unique factor in the affairs of the State.

At this time companies have been organized in Harrisonville, Oscoda, Alpena, Onaway, Cheboygan and the Soo. Five hundred boys between the ages of 9 and 19 years are already enrolled. Other companies are being organized as rapidly as possible and 2,000 will

be in the service before the coming on of the dry season.

The first company was organized at Oscoda with Oscar Swanson, aged 16 years, as captain. That company has already been hard at work and is an efficient fire-fighting organization. J. H. McGillivray has been appointed supervisor in the field and is traveling all about the northern part of the State organizing companies and telling the boys and their parents the purposes of the organization. The forestry department of the Michigan Agricultural college has offered Mr. Oates the services of its classes in the summer to be camp supervisors in charge of companies of scouts, and the big lumber men and timber men from all over Michigan as well as the department of education are lending every assistance to the work to make it a big success. A pamphlet has been issued which tells the purposes of the organization and includes a manual and general information as to the duties of the scouts and best methods of combatting fire.

It is not the purpose of the organization that any boy shall risk his life in fighting fire. He is rather to be the courier who shall notify the fire warden in his immediate vicinity of the outbreak of a fire and give such information as may be useful in locating it and fighting it. However, if a small blaze is discovered and the company of scouts puts it out, that redounds to the credit of the company, and medals given by the State are rewards to each scout who does efficient service.

BECOME LOVERS OF NATURE.

But the scope of the organization is wide. It is not confined to fighting fires alone. The object as laid down in the manual says:

"The primary, economic object of this organization shall be the protection of frontier life and property, and reforestation. Its moral object the development of health, chivalry and ap-

preciation of the duties of citizenship; its general object, the dissemination of a knowledge of the importance of prevention of forest fires to the boys and girls of the State and through them to their parents."

A knowledge of woodcraft, care in the lighting of fires in the woods, protection of birds and animals as well as life and property are necessary requirements of the scouts. The real usefulness of the organization is best shown by the examination a scout must take before he can be enlisted.

He must pass a creditable examination on simple fire-fighting and first aid. In the manual rules are detailed and the scout must study and know the first aid remedies for snake bites, cuts, burns, poisons, sun stroke, drowning, being overcome with smoke and all dangers with which a person in the woods may come into contact.

He must promise to observe the constitution of the State and of the United States and memorize the preamble of the latter.

Know how to use properly knife, hatchet, axe, shovel, mattock, flails of brush, sacks and blankets.

Know how to determine direction by a watch.

Know how to determine height of a tree.

Know how to tie a death grip, square fisherman's halter and lumber jack's single and double timber hitch.

He must either swim twenty yards, walk one mile in twelve minutes, row an ordinary boat or paddle a canoe one mile in acceptable time, according to conditions.

He must know the general State open season for the hunting of game and taking of fishes and his own county game law exceptions, if any.

He must be able to distinguish and name three indigenous forest trees, three indigenous water plants, three indigenous ground plants, three domestic game birds, three migratory game birds that pass over Michigan, three game fishes, six fur bearing animals.

Draw or orally describe tracks left by three wild animals.

Name the approximate time for spawning of one species of fish.

Name the approximate time when one species of wild animal bears its young.

Name the approximate time when a deer's horns are in the velvet.

Name the approximate time when a deer sheds its horns.

Name the approximate period that a fawn retains its spotted coat.

He must know and name three township, three county, three State and three federal officers.

He must know the qualifications for United States citizenship.

He must know the names and addresses of the deputy fire wardens in his district.

These requirements, it is manifest, will make a boy a fairly expert woodsman, it will give him an education along lines about which too few of the adults of today know much.

MEDALS AS REWARDS.

Medals of various classes will be provided by the State to be given to the individual boys for good service.

Medals of the first degree will be of approved metal composition and design and shall be known as the "honor medal." Medals of the second degree will be of gold and alloy composition and approved design and known as the "hero's medal."

Honor medals will be conferred upon scouts who have performed meritorious service to the State of Michigan in the saving of life or property, reforestation or advancement of the original and acceptable plans for the prevention of forest fires. This merit of service shall be certified by majority of the scout's own company certified to by his public school teacher and the supervisor of his township and approved by the field supervisor and the head of the department.

Heroes medals will be conferred for conspicuous bravery or good judgment in the saving of life or property.

Honor medals will also be conferred for the six best stories by boys and

girls of the public schools of Michigan which shall tell of the Michigan Forest Scouts or their work.

One honor medal of gold shall be awarded to the boy and one to the girl writing the best of the six stories, the stories to be selected by the head of the department.

Regulation honor medals will be presented by the field supervisor or an aid. Hero medals and first honor medals will be conferred by the governor in person or by a direct representative of the executive.

In addition to this W. B. Mershon, one man in Michigan who perhaps more than anybody else is interested in the protection of the wild life of the State, has volunteered to provide medals for essays on the conservation of bird life.

There are still other ramifications since various organizations interested in some particular branch of the work are planning to offer medals for essays or for actual work along the lines of protection of game, fish or tree and plant life.

The Lower Michigan Protective Association is now being organized to patrol forest lands and prevent fires. Thomas B. Wyman, of Munising, is the expert in charge of the work and it is proposed to use the boys in connection.

HOW TO ORGANIZE.

To secure a charter, to become an enlisted company is an easy matter. It is provided only that five or more qualified applicants apply to the field supervisor or the head of the department and that one of the applicants chosen by his school teacher and elected by a majority vote of his company shall be captain of the organization.

The names of the companies shall be chosen from the names of distinguished American soldiers, patrols, frontiersmen, Indian chieftains, or of some American plant, tree or animal.

The arms of the scouts are flails, buckets, mattocks, axes and shovels. The ammunition is dirt, sand and water.

The boys will be taught the first aid methods of treating sunstroke, scalds, frost bites, snake bites, poisoning, drowning, wounds of all kinds. They will be taught how to build safe camp fires and instructed in the necessity of extinguishing them. They will be instructed in how to cook in the woods, how to extinguish a forest fire, the methods in which forest fires run and how to avoid being overtaken and overcome. They will be taught the art of back firing without damage to other property, of building fire lanes and of protecting property when fire bears down upon it.

But his chief duty is to notify the proper authority of the advance of a fire. The chief township warden is the supervisor of that township and any justice of the peace is also a fire warden in his township. The scout is asked to bear in mind that the State does not require nor ask him to risk his life or limb in service. It is the scout's duty to care for life and property. His own life is held by the State to be vastly more valuable than property and as valuable as that of any other person.

If one or more scouts have knowledge of a forest fire it is the duty of the one having the first knowledge to dispatch a warning to a township warden. He is asked to make an intelligent report along these lines:

The kind of material in combustion.
The approximate area of destruction.

The probable area of destruction.
The possible area of destruction.
The establishment of a fighting line.
The means for fighting; water, sand or earth, flails, brush or water soaked sacks or blankets, fire lanes, etc.

FIRST FIRE EXPERIENCE.

Already Wolverine company, the first to be enlisted and under the command of Capt. Oscar Swanson, has been through the mill. It was in the district controlled by this company that a great fire swept all before it last year. Untold damage was done and hundreds were left homeless and starving. Young

Swanson, but 16 years of age, already knows the woods and knows the terrors of forest fire-fighting. He is a self-reliant lad and his company, the first of the Michigan Forest Scouts, is carefully drilled by him every way he can think of to make it an efficient fire-fighting force.

He gave his company a little test recently. A great pile of dead brush was situated in a clump of pines. He set it on fire in several places. Then he gave the alarm.

"Secure shovels," came his command.

The company promptly appeared in good order and armed with their shovels.

"Forward, at will!" he commanded. The boys came down upon the blaze like a Marathon.

"Shovels at will," was the next command. In an instant every shovel was dug deep into the snow and the snow was sent hurling upon the blazing brush pile. Like nailers the lads worked. They know their business. They stood on the windward side of the brush heap, away from the smoke and flame, yet where they could keep up that shower of snow dealing death to the flames. Two minutes and only steam rises from the brush pile. The captain stood back and proudly surveyed the work of his company over which he had command and which he had kept well in hand.

"That's the way we do it now," he said. "If it were summer time, sand would do the work quicker than snow." Then he told of his plans for the season which all northern Michigan looks to with dread.

"A grass fire? Yes, that's the way most of 'em start. But, pshaw! That's nothing, when you know how—providing it's a small one of course. And we figure on getting most of 'em before they get any size.

"We just cut or tear off a big pine or cedar branch and whip 'em to a frazzle. We get behind to the windward where it's safe. Then we whip along the sides and it keeps a dying down as we gain on it, till we meet in front. Then it's out.

"What'll we do with a great big fire? Why, there won't be any. That's what the scouts are for—to put 'em out when they are small. But if there should happen to be a big one, we would report it to the township fire warden and he would organize to fight the blaze. Most of the fires start when it's vacation in school and that's when we can watch for 'em.

"When there are no fires? Why then we'll put in the time cutting fire lanes to protect the towns and farm houses, and trimming the useless branches off'n the trees so the sap will go into the trunk and make 'em grow faster. Pretty soon we'll have our forests back again."

COST OF FOREST FIRES.

Young Swanson is an enthusiast and it is apparent he has had the necessary experience to make him an efficient officer. Forest fires in Michigan during the year 1911 did damage to the extent of \$3,567,438. They broke out in thirty-six counties of the eighty-three in the State. They left villages desolate and resulted in tremendous loss of life as well as property. They ruined thousands of acres of hardwood, meadows, slashings and swamp lands and made it necessary to call out the National Guard to care for the persons afflicted.

It is believed the organization of the Michigan Forest Scouts will be a potential force in preventing repetitions of such devastations. All the benefits will not be reaped in this generation for one of the important features of the work is to teach young men how to build camp fires without endangering the surrounding growth. When these boys grow up and become campers their lessons in woodcraft will have been learned. They are taught to see and extinguish the blaze in its incipency. This lesson will never be forgotten and in future generations the people of Michigan will reap the reward.

William R. Oates, State Game and Fish and Forestry Warden, is most enthusiastic over the movement. So is Governor Osborn, who devotes not a

1. The first group of people who are not in the labor force are those who are not in the labor force because they are not in the labor force. This group is the largest group of people who are not in the labor force.

The following table shows the results of the regression analysis for the dependent variable $\ln Y$ (ln of the dependent variable) against the independent variables X_1 to X_6 . The table is divided into two parts: the first part shows the results of the regression analysis for the dependent variable $\ln Y$ (ln of the dependent variable) against the independent variables X_1 to X_6 , and the second part shows the results of the regression analysis for the dependent variable $\ln Y$ (ln of the dependent variable) against the independent variables X_1 to X_6 .

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THE FOREST SERVICE APPROPRIATION

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are not needed for public purposes, and may list and describe the same by metes and bounds, or otherwise."

The only new element introduced in the amendment passed is that it carries an appropriation which will enable the Forest officers to classify the lands chiefly valuable for agricultural purposes prior to the filing of application for them by settlers. This is wholly in accord with the policy of the Forest Service, and only the lack of funds hitherto has prevented any extensive classification of such lands.

It was believed that the amendment proposed by the Senate contained elements of vagueness which were capable of endangering the interests of the public. It seemed possible that lands chiefly valuable for timber, timber growing, water power development, reservoir sites and other uses, but possessing secondary or even slight agricultural possibilities might be required under a strict interpretation of the proposed law to be opened to private exploitation, in which agricultural possibilities would be only a pretext for acquiring title.

An improvement over past appropriation laws is in the provision that no land listed for agricultural settlement under the Act of June 11, 1906, shall pass from the Forest until patent issue. Formerly it was held that land thus listed even though unoccupied or abandoned was forever alienated from the Forest.

The new law carries an appropriation for the administration of the Appalachian forests now being acquired.

Although a number of Assistant Forest Ranger positions have been dropped from the statutory rolls the money available for salaries will permit the temporary employment of more than that number of Forest Guards during the fire season.

An analysis of the sums carried in the appropriations shows a slight decrease this year, as shown in the following:

	1911-1912	1912-1913
Salaries -----	\$2,318,680	\$2,235,760
General Expenses ----	2,714,420	2,707,285
Permanent Imp. ----	500,000	400,000
Total -----	\$5,533,100	\$5,343,045

Permanent improvement money in the new law is considered a part of the general expense moneys, but for purposes of comparison it has been segregated.

Further comparison of sub-allotments is as follows:

	1911-12	1912-13
Fires and emergencies.....	\$150,000	\$150,000
Equipment and supplies....	198,080	155,000
Investigations in wood distillation, preservatives, paper making, timber testing, etc.	177,040	170,000
Grazing investigations ----	18,420	20,180
Market and miscellaneous investigations -----	33,760	31,360

The 25 per centum of gross revenues will be turned over to the States in which National Forests are located to be applied to the road and school funds, as in the past. The new law provides. "That an additional ten per centum of all moneys received from National Forests during the fiscal year ending June 30, 1912, shall be available at the end thereof to be expended by the Secretary of Agriculture for the construction and maintenance of roads and trails within the National Forests in the States from which such proceeds are derived, but the Secretary of Agriculture may, whenever practicable, in the construction and maintenance of such roads, secure the co-operation or aid of the proper State or Territorial authorities in the furtherance of any system of highways of which such roads may be a part."

While the ten per centum will be expended in building roads and trails primarily for the use and convenience of forest users and those traveling across the Forests, in most instances these public improvements will greatly assist the Forest officers in transacting their business and in further protecting the Forests and rendering them of wider use.

While a larger appropriation could have been wisely used, the new appropriation law, carrying practically the same sums as last year, is probably sufficient to the Forest Service.

INSTRUCTIONS IN TIMBER ESTIMATING

By EDWARD C. M. RICHARDS, Ph. B., M. F.

WE of the Senior Class of the Yale Forest School had always heard that timber estimating was a very peculiar part or branch of the lumber business. There seemed to be something mysterious about it. We had always understood that the best cruisers were men who had lived in the woods for the greater part of their life and perhaps had even been born there. It seemed hardly possible that a lot of men who had lived in cities and large towns for the most part could reach a point where they could claim even a fair knowledge of the art. For besides the seeming necessity of having to have lived in the woods for the greater part of one's life, still there seemed to be something weird connected with the work. We could not have told just what it was or where we had gotten the impression, but it was there nevertheless. Imagine our surprise, therefore, when one morning last spring while we were camped along the I. & G. N. Railroad near Trinity, Texas, our instructor told us that anyone with careful attention to detail and a lot of hard, but carefully directed work, could gain a very fair knowledge of cruising as it is done by the best of the men who make it their life work. He said that it was not necessary that men live in the woods all their life to gain skill and accuracy, but that one thing amongst others that men of this class had which fitted them for the work better was the experience which they had had as regards the allowance for the defects which are found in timber. This would have to be learned by experience. that all of the methods of work and a considerable amount of the skill required to carry out these methods could be learned by us in the time which was allotted for this purpose.

A fairly brief summary of the course of instruction which we went through is as follows:

The country about Trinity had never been covered by the Government in their rectangular survey, and, therefore, all of the surveying which had been done had been done in small and very irregularly shaped areas. Some of these surveys were as much as a hundred years old and in many cases it was very hard for us to locate the old lines. A regular crew had been at work at this for some time, however, before the estimating started and the boundaries had assumed a recognizable aspect in practically all cases. But for the practice work in cruising we laid off two sections of land which were assumed to be numbers 1 and 36. This made the line separating them a township line and the east end of this line was the township corner. The lines around these two sections were blazed as were the lines in each, dividing them up into "forties," and ten-acre plots. In this blazing work the trees were blazed on the side facing the line and a single horizontal crayon mark was made on each line blaze. Trees which were directly on the line—"line" trees—were blazed "fore and aft." The corners of the forties were staked and each stake was marked with crayon so as to locate it with regard to its position in the section. Along the lines dividing the sections up into forties, stakes were set at distances of 330, 660 and 990 feet from the corners and each stake here was also marked, giving the position as regards its location in the forty. These stakes were for the purpose of enabling a compass man running across the forty to check himself up quickly and easily during the practice work. All of this work was done with a steel tape and a staff compass and care was taken to do the work of setting stakes correctly as we all were to use this sample area for some

time and therefore it was best to take pains and lay the work out well.

As all of the work in the field had to be done by pacing, therefore of course the work on the practice sections had to be done in the same way. But most of us had not paced very much and those that had done so had gotten out of practice. Professor Chapman therefore placed the corner of the imaginary township exactly one mile—by steel tape—from a certain point on the railroad track in front of the cook shanty, and set a stake at each quarter of a mile. Every morning as we went to work and every night when we returned we paced off that mile, and as the work lasted for a number of weeks, by the time we were ready to go out on the actual field work we knew our pace very well and, what is much more to the point, we became used to pacing and had learned a lot about regulating our pace over different kinds of ground.

After laying off the forties crews were sent in on each of them to tally the merchantable timber. In this work the crews worked in strips caliper every tree of merchantable species—short leaf or loblolly pine—of a diameter greater than 10" at breast height. One man of the crew tallied the diameters of the trees as they were calipered by the others. As a tree was calipered the man who calipered it called out the diameter to the tallyman and then blazed the tree to show that it had been tallied. The trees were blazed on the East side for the West half of the forty and on the West side for the East half of the forty, so that any tree which was above 10" D. B. H. and which had not been calipered and tallied could be easily found by walking down the central line of the forty and looking on both sides of the line. In measuring these diameters the scale of the calipers was read only to the nearest inch.

While this work was going on two men of the crew were taking height measurements with Faustman Height Measures, recording the merchantable height of the trees along with their D. B. H. In doing this work the men

were cautioned to get as many heights as possible but to be sure to get the heights of all of the very large trees and to distribute the rest of the heights over as wide a range of diameters as convenient. These heights were in the form of the number of sixteen foot logs in the tree allowing about sixteen inches for the average stump height. Every man on every crew had to perform each of these jobs so that we all had a fair chance at the work as it progressed.

The idea of doing all this blazing and measuring was to get as accurate an estimate of the standing timber on each of the forties as possible. From the D. B. H. tally we got a complete tally of the number of trees of each diameter on the forty and from the height measurements we got an excellent idea of the number of logs in trees of all diameters.

From the above data estimates on the contents of the different forties were worked out by means of a volume table based on the D. B. H. and the number of logs in a tree, and this set of estimates was assumed to be as nearly correct as it was possible to get them with reasonable amount of work. And in addition to the estimate, a tally was made of the number of trees of each diameter and of each height—in number of logs—on every forty. This was used as a checking system for our work and proved very valuable.

When all of the above work had been finished, the actual work on the practice forties began. The method was about as follows:

At first crews of six men were sent out on the sections. These crews consisted of a compassman, a checker and four estimators. Each crew ran strips ten rods wide back and forth across the forty, making one strip just touch the next one and in this way covering the entire area the first time the forty was run. After the forty had been run once, the crew turned about and re-ran the same forty again. The reason for this was because on the first running the cruisers walked on one side of the man with the compass

and stayed on that side while the forty was being run. He tallied the diameter and number of logs of every tree on the strip between himself and the compassman of all trees which had blazes on them—showing that they were above 10 in diameter. At the end of the forty each estimator had the complete tally of all of the trees on half of the area. On the re-running of the area the men changed over to the other side of the compassman and in this way got a tally of the rest of the forty.

The compassman merely had to run the compass and pace off the different distances across the forty so as to check up on his pacing, while the sixth man or checker carried a pair of calipers and a height measure and his work was to check up the estimates made by the others in diameters, heights and in the width of the strips which they were running—i. e. the distance between the estimators and the compassman. At the end of the day's work each of the estimators worked out his own tally and determined his own estimates of the amount of standing timber on the forty. He also had to add up on his tally sheets the number of trees in each height and each diameter class. When he had done all of this he went to the instructor to check up his work. This checking was very well arranged, for by this system a man was not only able to find out how nearly his total estimate of the stand came to the assumed true estimate, but he was able by comparison of the tallies of the diameter and height classes, to get a very good idea as to the errors that he was making in his work and what he had better do to correct them. For instance a man might come out fairly close in his total estimate for the forty, but, on checking up his work with the diameter and height tally, might find that he was over estimating his diameters—which gave him larger logs—and underestimating his heights—which diminished the number of logs just enough to make the total estimate look very well, whereas the real work was far from being good. In this way we were checked up day by day and the improvement in the work of the men

was marked after we had got the hang of the methods.

This sort of work was, of course, altogether too slow for practical cruising and was really used with the idea of getting our eyes trained to the estimating of the diameters, heights and distances and to give us a little idea of of the sort of work we were to do. It lasted only a short time, for within a few days we began to alter the method by which we ran the strips across the forty and to use some of the other systems of covering the area. The different time-saving methods which we took up and gave a good trial were some of those well known to cruisers such as the "log run" method, methods of widening or narrowing the strips, counting all of the trees on the strips, but tallying only one in five; making of a topographical map by the compassman while the work was going on and other methods and schemes to help make a cruise more speedy and more useful. All this work was done on the sample forties and of course we were shifted about every day so that we should not have to use the same forty twice in succession. The check man soon was eliminated and each estimator had to carry his own calipers and do his own checking. And always we had the checking up system with the instructor in the evening.

Finally individual cruising was introduced and we had to run the compass, keep track of the pacing, count and tally the merchantable trees all by ourselves. Here we also tried the sample acre system, the "Ward" method, and other schemes of getting the contents of stands. But through it all we had to check our pace twice a day, our estimates of diameters with calipers and our tally of heights and diameters in the evening.

At the end of two weeks of this practice work the actual work of cruising the timber for the Lumber Company began. A somewhat brief outline of this work is as follows:

As stated in another part of this article, the country around camp was not surveyed by the governmental rectangular survey and was broken up into

countless small irregular surveys ranging from patches of fifty to sixty up to tracts covering several hundred acres. Much time had to be spent by the "landline crew" in re-running the boundaries of these tracts and as in many cases the original work had been done a great many years before, a good deal of trouble resulted. Finally all of this work was done and the whole region which was to be estimated was mapped to the scale of 2,000 feet to the inch. Then small maps or tracings were made of the different areas which each crew was to cover in detail. These tracings covered on the average about three sections of land—1920 acres—and the crew was required to estimate the timber, make a topographical map to the scale of 2,000 feet to the inch and which gave the elevations in 10-foot contours, collect a description of the different types of the forest found on the area, and hand in a written report on all of this material. The time allowed for the whole work was one week.

In doing this work the tracing map area was divided up into "blocks" of as nearly 160 acres in size as possible. Each of these blocks was estimated separately—using different tally sheets for each, but running the compass lines right through all of them, and then by adding up the different estimates for the blocks, the contents of the whole area was gotten.

The crews were made up with three men in them as a rule, but in a couple of cases two men crews were used. Each crew had for equipment a staff compass, two pairs of calipers, a tracing map of the area to be covered, note books for the daily tally of trees, erasers, pencils, scales graduated to decimals of an inch, canteens, blazing hatchets and haversacks for carrying lunch.

One man ran the compass for one-third of the time while the other two estimated and took notes on the forest. The former also had to make a topographical map as he went along. The cruisers—as differentiated from the compassmen—had a tally sheet made out in their note books in which they

recorded the trees tallied under diameter breast high and the number of sixteen foot logs to half log lengths. The method used was the parallel alternate strips and 50% of area was to be covered. The various shapes of the areas covered necessitated running the strips in various ways, but the per cent covered had to remain approximately the same. For the two-men crews, however, the per cent covered was only 25. The compassman ran the lines across the tract parallel to each other and the two estimators walked on either side of him, each counting all of the trees on the strip lying between himself and the compassman—5 rods—and also on a 5-rod strip on the other side, of 10 rods in all and 20 rods for the crew. All merchantable trees were divided into two classes—"Pine" and "Others." In the case of the former or the "Pine," every fifth tree counted was tallied, the tree nearest the cruiser being the one tallied in every case, according to the diameter breast high and the number of sixteen foot logs. In the class of "Others" belonged the gums, cottonwoods, sycamores, oaks, etc., and they were tallied log by log, the number of trees being so much less than in the case of the "pine" that the "one in five" system was not necessary, and also as we had no volume table adapted to such trees every log had to be tallied separately.

In addition to the above data, it was necessary to take notes for a forest description. This was to cover the per cent of the different species present, the average clear length of bole, the form of the timber—whether knotty, crooked, etc.—the amount of damage done to the forest by fire, insects and rot and data which might come up in the course of the cruise. The amount and condition of the young growth both of pine and others both in the forest proper and on any old fields or deserted clearings also was required. And finally the condition of the reproduction—as differentiated from the young timber—and some idea as to how the different species reproduced themselves in different parts of the area covered.

It was found that in working of the shortleaf pine uplands it was possible to run about four miles of line in a day and collect all of the above data, thus covering 320 acres.

From every standpoint the work was a success. We had a chance to learn a great deal about locating old lines in the woods, of mapping in a wooded country, and other things which go far

in making a man efficient in woods work. But most of all we gathered an idea of how timber estimating ought to be carried on, and found ourselves finally able to make a respectable showing in the work. We had a very fair idea of the shortleaf pine country when we finally said good bye to Trinity and started for the North.

CANADIAN FORESTRY MEETING

THE Forestry meeting which is to be held at Victoria, B. C., Sept. 4, 5 and 6, is the Fourteenth Annual convention of the Canadian Forestry Association which meets in British Columbia upon the invitation of the Government of that province. This is the first time since 1906 that the Canadian Forestry Association has met further West than Regina, its gatherings having been held in the interval in the big eastern lumber centers such as Toronto, Ottawa, Montreal, Quebec, and Fredericton.

One of the chief subjects of discussion will be furnished by the new forest law which has just been enacted by the Government of British Columbia, and the organization and scope of the British Columbia Forest Service now being established. The relation of this law and this service to the lumbermen in the mountains and on the coast, and to the railways will be set forth, and some points, no doubt, keenly debated. The Government is taking a keen in-

terest in this convention owing to the immense importance of the forests of British Columbia and the large revenue which they bring in to the province. Sir Richard McBride, the Premier, and Hon. W. R. Ross, the Minister of Lands, will address the Convention upon the law as it affects their departments. The lumbermen and the railways will be well represented by those qualified to speak from their respective positions. Quite a large number of prominent men in forest administration and lumbering are expected to attend from Eastern Canada, as well as from points nearer the Pacific Coast, and a number are also expected from the United States.

It is proposed to begin with a reception on the evening of Sept. 4, followed by regular sessions in the mornings and afternoons of September 5 and 6, concluding with a banquet on the evening of September 6. Delegates from the United States will be cordially welcomed and given full opportunity to participate in the discussions.

IRRIGATION FOR NEW SOUTH WALES

Mr. N. R. W. Nielsen, formerly minister for lands, who represented the New South Wales Government at the Chicago Irrigation Congress and afterwards conducted an investigation into the irrigation methods of the United States, has issued a report in which he says that the eastern coast of Australia can be made quite as productive as any similar area in the United States or Canada. He recommends that the Government undertake extensive irrigation works, declaring that the cost of these would be amply repaid.

WON FOREST FIRE FIGHT

THE story of a strenuous and stubborn fight against a forest fire which raged over 24,000 acres and did damage to the extent of about \$30,000 is that brought back from the Sitgreaves National forest of Arizona, in the Third district, by Assistant District Forester F. C. Pooler. It is a story which includes an eighty-mile gallop from Snowflake, Arizona, by a dozen rangers in twenty-four hours over rough country, a night and day struggle amid sizzling heat and acrid, blinding smoke to drive back fierce flames which, driven by high winds, often leaped hundreds of feet at a time. As high as forty men, including assistants from ranches and cow camps, were engaged for many days trying to head off the fire, and the entire expense to the service in extinguishing the blaze was about \$1,700.

Putting out the fire, which had a circumference of some thirty miles, was made the more difficult by the fact that the scarcity of rain had made things extremely dry and that the sheep had not yet been brought in to this district. The Chevalon district, of the forest for their grazing; and because only from fifteen to eighteen ranchers reside in the whole district.

The fire was started by lightning and because of the sparsely settled nature of the country would have swept an enormous area but for the forest service organization and the fact that seventy miles of telephone line have been installed in this region by the government in the past year.

The Sitgreaves forest is 893,720 acres in extent and the density of the timber is indicated by the fact that half a million dollars worth stood on the burned area, the total loss being comparatively small in proportion to the aggregate of standing timber. A few cattlemen joined the forest service employes in the fight, although it is said

one large outfit that could have furnished a dozen men failed to do so.

Delay in reporting the fire resulted from a curious incident. The lookout who climbed with his spiked climbers to the top of a 110-foot tree to take his daily reconnaissance saw and reported a fire on the Coconino forest, adjoining, on June 7. Directly in line with this fire was the smoke from the incipient conflagration on the Sitgreaves, which smoke appeared to be a part of that from the Coconino and it was not until the next day, June 8, that the lookout telephoned in the report of his own fire which by that time was well under way.

The first report came in to the ranger station at 8 p. m. and next morning at 1 o'clock a force of fire-fighters was on the scene, the aid of a few local residents being secured. June 10, after the rangers had been fighting desperately night and day to head off the blaze, a call for help was sent in to Snowflake and Supervisor Jennings, of the Sitgreaves, with Mr. Pooler and a dozen rangers, hastily saddled up and "hit the trail"—and a very rough trail at that—for the fire, making the eighty miles in twenty-four hours, arriving at 4 in the evening, eating a hasty lunch, starting to work and eating nothing until well into the next day. All that night, all the next day and all the next night the little force worked without rest. The fire was burning on about 5,500 acres when the officials arrived.

The fire would apparently be checked when at noon every day a high wind would spring up and by 3 o'clock the heat would be so intense that the fire-fighters could not approach it, blazing bark being hurled five hundred feet before the wind to start a hundred new fires ahead of the main front. Finally a fire line a quarter to half a mile wide was run from Leonard canyon to Willow creek, which checked the ad-

vance of the flames, this fire line being about four miles in length. All this was cleared out in one day's time, which is believed to be about the record time for such a performance over so large an area. For three days a total of forty men was at work, when the force was then cut to fifteen or twenty.

The damage to green timber is estimated at \$15,000, and in reproduction at \$15,000, a total of \$30,000.

While the forest service men don't say much about the details of the fight a few meagre particulars indicate that it was a fierce one. Camp was pitched at what was considered a safe distance from the fire, which, however, was right on top of the bivouac in an amazingly short time, strenuous work being necessary to keep the camp site and a square mile of feed for the horses free of fire. On every side of this square mile the fire was raging. No serious injury to any of the fire-fighters, however, is reported. The task which confronted them is shown by the estimate that an army of 400 men could not have checked the advance of the flames in the afternoon when the wind was fanning it.

The army emergency ration was tried out at this fire but found unsatisfactory for fire-fighters while at work, because of its dryness. Water had to be hauled some distance to supply the rangers and they drank gallons of it. Spellmire and Lyons, of Winslow, furnished a part of the force of men at work.

Supplies and tools which had to be hauled part of the way and packed part of the way were on hand and ready. Arrangements are now being made for connections with the military telegraph line which runs through this section, and the installation of the telegraphones throughout the forest for use on that line. Last year there was no telephone wire on the forest and the building of seventy miles this year indicates the extent of the fire protection measures being taken by the service.

The supervisor at present can call up any of his rangers over the telephone, but the telephone service will make

communication much more complete. A considerable sum will be spent this year in further trail building and improvement.

The number of tree lookouts will be increased and these will be supplemented with lookout towers with triangulation to secure exact location. How useful these lookouts are is demonstrated by the fact that in another district of this same forest where there are natural points of vantage in the shape of bare peaks, twelve fires were reported by the lookouts and extinguished with a total expense to the government of \$50 and damage only nominal.

Six rules have been printed on placards and sent out from headquarters to be placed in hotels at the Grand Canyon, Flagstaff, Williams Santa Fe and other places where the forest-using public may see them. The placard is as follows:

The Six Rules for Care With Fire in the Mountains:

If every member of the public strictly observes these simple rules the great annual loss by forest fires will be reduced to a minimum.

1. Be sure your match is out before you throw it away.
2. Knock out your pipe ashes or throw your cigar or cigarette stump where there is nothing to catch fire.
3. Don't build a campfire any larger than is absolutely necessary. Never leave it, even for a short time, without putting it out with water or earth.
4. Don't build a campfire against a tree or log. Build a small one where you can scrape away the needles, leaves or grass from all sides of it.
5. Don't build bonfires. The wind may come up at any time and start a fire which you cannot control.
6. If you discover a fire, put it out if possible; if you can't, get word of it to the nearest United States forest ranger or State fire warden as quickly as you possibly can.

A TREE

By BURT W. JOHNSON

IN front of a roaring fire an old man sat watching the flames that devoured the huge knotted back log. Little flashes of light danced across his stern features as the flames leaped savagely over that piece of the fallen monarch. And as he sat, the old man mumbled to himself: "That sugar-tree ought to keep me warm nigh on to Thanksgivin'." Giving the log a vigorous poke he leaned back contentedly in his armed rocker. He had cut the tree and piled its wood in the shed, and maple surely does make a good fire.

Suddenly the old man ceased rocking and the firm lines of his face softened, a slight flash of pain crossed his features. His gray eyes were looking far beyond the flames from the log. He saw a tall, majestic tree standing near the middle of the road, its thick branches reaching beyond a rail fence on the other side.

Then he thought of the little yellow-haired boy who had so often climbed among its branches in search of a fork, or only to see how many eggs the robins or doves had. Of the kindly old man who had said with pride: "Ain't she a beauty, Jamey, I tell ye, my boy, she ain't never agoin' to be cut while I am here. No siree, for Lord, where would the birds build their nests next spring? Just think of lame Tom a comin' up the dusty road all hot and clean tuckered out a peddling of his trinkets. Where would he rest? She is a friend in need, my boy, and they are mighty few these days, a shelterin' bird, beast and man."

The man before the fire began to rock slowly. Yes, that old gentleman had been his father, and he the boy. Now the boy had grown to be an old man, and some said like his father. They looked alike, to be sure, the same thin nose, square chin, and eyes—no, the eyes were not the same, for the father's had been of softest blue that were filled with tenderness and sym-

pathy, and the son's a cold, steel-grey without a trace of pity.

Yes, this is the same stern man sitting in his easy rocker, gathering memories from the glowing coals of a fire; yet the eyes are no longer steel, but soft and tender. Tears have stolen from a forgotten source down upon the grim old cheeks, and glisten in the firelight. Taking the tongs from the hearth-stand he slowly turned the burning log over, bringing a large knot into view, so shaped as to form a pocket with the body of the tree. In this same pocket he had once found a wren's nest and in it two speckled eggs.

"Guess no wren will build in that hole next year. You were a fine big tree."

The old man's voice trembled as he addressed the now smouldering remains of the tree. "That artist fellow that painted ye seemed almost to worship ye. I recollect his sayin' suthin' 'bout ye bein' an inspiration to mankind. He went on like that for quite a spell. Guess he thought quite smart on sich things."

For a long time the only sound in the room was the sizzle of sap in burning wood, and the creak of rockers on the floor. Outside the wind blew cold around the corners of the house and through the naked trees. A long cold winter was expected and started. "It keeps a body busy fightin' off the cold. Haven't time to think how things look." The cold wind outside had caused these thoughts. The memory of the summer brought others, these he began to mumble aloud, breaking the silence.

"No, it won't make much difference now. But when the sap begins to run, the birds come huntin' a place to build in—it'll be burnt and the ashes layin' out in the orchard. Wonder what that artist will say? He said he would be back next summer. Well," and the old man put his feet down with a thud, "whatever he says I'll tell him that the

tree was in the way and—I needed wood.”

He carefully covered the coals with ashes and started for bed. It was late. He could not remember sitting up so late for years.

The winter, as predicted, was a “freezer” even for New England, And Spring, late in coming, was welcomed by all. Soon the bitterness of winter was forgotten. The summer became as hot as the winter had been cold. The old bachelor’s house stood back among the locusts as always. The little vine-covered porch was the same. There was the orchard behind the arbor.

Something seemed wrong to the traveler as he plodded up the dusty road in the merciless sun, looking expectingly for shade. Now he understood the change in the familiar old place. A landmark, a pioneer of the country, a friend, had been taken from this place. There was the stump. The sun seemed to beat down even hotter where the branches had once shaded.

“Who could have done it? That old heartless skinflint? What would his pa say?” The traveler looked bitterly toward the house. “What is that?” Near the edge of the road, carefully protected by white stakes, a young sugar maple had been planted.

NORTHWESTERN FOREST FIRE CONDITIONS

JULY passed practically without forest fire loss, August begun with unusually favorable conditions, and better equipment than ever before by all protective agencies except the federal forest service, which is hampered by congressional delay in acting upon its appropriation, is the summary of a statement issued early in August by the Western Forestry and Conservation Association upon advices received from all protective headquarters in the Pacific northwest. Due partly to the weather but also to the perfection of preventive measures which, like the block signal system on railroads safeguard without being spectacular the situation is novel in that the middle of the usual four months fire season has arrived and there is not a single fire of importance to report.

Although small fires are becoming numerous, green timber is not dry enough to carry them unless strong wind prevails and the patrol forces are handling them promptly. The season has been favorable for disposing of dangerous slashings and never before has there been such system and success in extinguishing smoldering logs and

snags left after burning to become a menace later. On the other hand, the growth of grass and underbrush has been so heavy as to threaten peculiar danger from now on. Marked improvement in care with fire is reported, although there is considerable complaint against careless leaving of debris by county road builders and against the operations of small and irresponsible loggers.

The State Forester of Montana has received \$3,500 from the federal government through the Weeks law to be used outside the national forests in the territory protected by the State and the Northern Montana Forestry Association.

Idaho has had a few small slashing and lightning fires but practically no damage. The co-operative patrol associations have completed several new telephone systems and are rapidly increasing patrols to meet expected dry weather.

Washington reports no July fires of consequence, but the laws are being enforced rigidly to prevent danger later. Several attempts to burn without permit or operate unguarded en-

gines have been followed by prompt arrest and conviction. The Washington Forest Fire Association has 90 patrolmen out and is devoting special attention to finding and extinguishing any fire left after spring slash burning. The State Forester has 27 regular wardens on duty and is increasing this force gradually, besides having a special force of 35 secured by government aid under the Weeks law.

Oregon had but one fire worthy of mention in July and this was speedily extinguished, without loss, by the Columbia County patrol association. About 350 wardens are on duty in the State outside the national forests, employed by State, counties and private owners.

Although the usual fire season is half over, Congress has made no appropriation for the federal forest service. The national forests are being guarded on a deficiency fund, which it is said would be wholly inadequate in an ordinary season, but so far there has been little loss.

It is emphasized by all authorities that, while the immunity enjoyed so far shortens the dangerous season and has permitted careful preparation, a few hot drying days may bring the maximum hazard at any time now. All persons are urged not to attempt slash burning and to exercise great care with sparks, matches and camp fires.

EARLY LUMBERING

THE early experiences of an old lumberman are told by John Swan, of Clay, W. Va, in a letter to the editor, in which he contrasts the past with present conditions. He says:

"I was born in Clearfield County, Penna., December 4, 1845, and my father was a lumberman. I followed his foot steps. Father's first experience was making square timber from the white pine forest in the old home county, which was covered with the finest trees that man ever looked at. Father made his timber 30 to 50 feet long and they were almost perfect. When he came to the knot he cut it off, and what a waste there was left to rot and make food for the forests' great enemy, fire. Father hauled his product to the Susquehanna river, rafted it to Port Deposit. There it was made in to floats and taken to Philadelphia and New York through the canals, and was sold for 6 to 8 cents per cubic foot. Then the men who helped do the work walked back to their forest homes, 200 to 300 and more miles. When I was a man the same process was gone over with this addition: we ran the lengths from 30 to 90 feet long and hauled to the same beautiful Susquehanna river only the distance was from four to eight miles and we received anywhere

from 15 to 35 cents per cubic foot. We then got into a train and rode to within eight to ten miles of our homes.

The mighty giants are all gone now and when I pay a visit to the old home I find the beautiful forest destroyed. fire havng eaten up what man left.

In my more mature manhood I made spars and we put 20 of these into a raft. These spars were from 82 to 100 feet long, 17 inches up at the top. The butts were dressed down to the same size, 12 feet from the butt. We often sold each stick for as high as \$150 to \$175. I remember one stick in particular that was 100 feet long, 22 inches at the top, straight any way you looked at it. This tree or spar brought \$500 in the New York market.

Alas, these are all gone from that grand forest of years ago. There is such a small area of virgin forest left in the Eastern, Middle and Southern States that in a very few years there will be none left to look upon. I was very glad to see a law that made it possible for the Government to secure a large area and preserve the beautiful trees. I would be glad to help care for some of the lands, as there is nothing so beautiful to me as an undisturbed forest.

\$20,000,000 YEARLY FROM ONE FOREST

THE Forest of Campiègne, France, though a realm of beauty and enchantment to its lovers, is yet made by the State to yield an annual income of one hundred million francs (\$20,000,000), writes Lillie Hamilton French in the September *Century*. For this purpose it appoints seven *brigadiers* and twenty-seven *gardes-forestiers* besides several *gardes-cantonniers*. The *cantonniers* look after the roads, the guards protect the rights rented to the sportsman and wood-cutter—the two great clients from whom these revenues are derived—two hundred thousand francs a year being paid by the sportsman and eight hundred thousand francs by the wood-merchant. The guards must also see that these two groups of clients never encroach on each other's rights, for though the sportsman may hunt on the wood-merchant's land, he cannot carry from it a splinter of green wood; while the wood-merchant would have a suit brought against him if he were to pocket so much as a rabbit found burrowing under one of his dearly purchased trees. And some of these trunks *are* dear, one of oak frequently costing him a thousand francs.

So far as the question of revenue is concerned, *la chasse* is made to designate every right, whether of fishing or

hunting, which is rented to the sportsman. As a diversion, however, it means to its votaries two distinct kinds of hunting, the most important and picturesque being the *chasse à courre*, or hunt by pursuit, and in whatever direction the stag may lead. This takes place twice a week after the cold has set in, and always on horseback, with a following of hounds. This *chasse à courre* is never rented except to a single person, and usually for six years, at an annual rate of 17,300 francs (\$3,460). When the lessee is frugal, as he occasionally is, he sublets it.

On the other hand, the *chasse à tir* or hunt with fowling-pieces, is divided into twenty-five "lots," and rented for various prices from twenty francs or more, and includes the right to shoot, within certain limits, hare, rabbits, doe, pheasants, and wild birds. The opening and closing of the *chasse* is decided every year by the *prefet*, as our Thanksgiving day is by our President, though it is generally on the last Sunday of August that one hears the report of the first authorized gun. The event is one of almost national importance, chronicled by every newspaper in the land, and discussed by every Frenchman, high or low, rich or poor.

OLDEST LIVING THINGS

THE oldest living things in the world are the sequoia trees in the General Grant and Sequoia National Parks, California. The Forest Service recently issued a bulletin telling all about them and how to get to them. These trees are also the tallest trees known. Within the two parks there are thirteen groves containing over 12,-

000 trees larger than ten feet in diameter.

It is estimated that some of these trees were growing 4,000 years ago. In fact, annual wood rings have been counted on one of the fallen giants in the Sequoia Park showing that it had reached that age.

The great pines of the Pacific coast,

400 and 500 years old, have reached old age, but the sequoia trees, several times as old as the great pines, are still in the bloom of youth.

They do not attain prize size or beauty before they are 1,500 years old and are in their prime when 2,000 years old, not becoming old in less than 3,000 years. Not only do these trees stand in a class by themselves because of their long life, but they are classed among the wonders of the earth because of their giant size.

In the giant forest in Sequoia Na-

tional Park, where the giants are named for men who have been prominent in public life, the General Sherman is 286 feet high and 36 feet in diameter, the Abraham Lincoln 270 feet high and 31 feet in diameter, and the tallest is the William McKinley 291 feet high and 28 feet in diameter.

In the General Grant Park the principal trees are the General Grant, 264 feet high and 35 feet in diameter, and the George Washington 255 feet high and 29 feet in diameter.

THE TALLEST TREES

THE big tree supremacy of California is being disputed by Australia. The tallest tree yet discovered in California was found by actual measurement to be 340 feet high. Australia's record gum tree can beat this by 140 feet. Baron Mueller, formerly government botanist of Victoria, is quoted as saying that Australian gum trees attain a height of 500 feet. But the tallest tree the baron measured was a prostrate one on the Blacks' Spur, ten miles from Healesville, totalling 480 feet. This tree was

81 feet in girth near the root. Another found in the same locality was 415 feet high, with a circumference of 69 feet at the base. Mueller refers to this species as "the highest tree on the globe, surpassing the famous California sequoia and Wellington pine." In 1889 G. W. Robinson, civil engineer of Berwick, in a journey from Gippsland to Mount Baw, measured a tree 471 feet high. The height of this specimen had previously been estimated at not less than 500 feet.

PINE LANDS OF NICARAGUA

CONSUL ARTHUR J. CLARE of Bluefields reports that "the pine belts on the Atlantic coast of Nicaragua extend north from the Rio Grande along the 84th meridian, west longitude, following the coast line into Honduras, and vary in width from 10 to 30 miles. This territory is traversed by the Walpasixa, Prinzapulka, Kukalaya, Wawa, Sisin, Awastara, and Wanks rivers and incloses the lagoons of Pahara, Twappi, and Beymona.

"All the above-named rivers are navigable, but bars across their mouths prevent large vessels from entering

and navigation at present is carried on by gasoline boats, canoes, and 'pit-pans.' The latter are large, built-up canoes capable of holding several tons of freight each.

"The land for a few miles on each side of the rivers mentioned is a dense jungle, where mahogany cutting is now carried on, log rafts being easily floated downstream. Inside from these jungles and around the lagoons the pine lands extend, and to obtain the best results railroads must be built to carry out the logs or sawed lumber.

QUESTIONS AND ANSWERS

Philadelphia.

EDITOR AMERICAN FORESTRY.—Can you supply me with a copy of the works of Prof. J. Franklin Collins and Howard W. Preston? Illustrated Key to the Wild and Commonly Cultivated Trees of the Northeastern United States and Adjacent Canada, bound in leather, also identification of the Economic Woods of the United States, by Samuel J. Record, M. A., M. F., bound in leather?

A. J. BONSALE.

The book to which you refer by Professors Collins and Preston is listed as *The Key to New England Trees, Wild and Commonly Cultivated*, and is published at Providence, R. I., by the firm of Preston and Rounds. I think you can get full information in regard to it from them. The other book, *Identification of the Economic Woods of the United States*, by Prof. Record, may be obtained from Messrs. John Wiley & Sons, 43 East 19th Street, New York City.—
Editor.

New Orleans, Louisiana.

EDITOR AMERICAN FORESTRY.—Insects are injuring my fine ash trees by boring into them. I inclose description. Will you kindly tell me what to do?

JOHN B. FERGUSON.

"In the absence of specimens of the insect which is injurious to the ash trees, I am unable to name the species. There are two insects which are injurious to ash by boring through the bark and into the heartwood, and I judge from the description which you give that the species concerned is probably the lilac borer (*Podosesia syringae*.) The remedies to apply are practically the same as for the leopard moth, considered in Circular 109, which will be ordered sent to you by the Division of Publications. If you are in doubt about the species I would advise that you send living specimens, if possible. I inclose frank and franked envelope to be used without postage in accordance with directions given in the inclosed circular letter. I am not quite certain that the species I have mentioned occurs as far southward as New Orleans, hence the advisability of obtaining specimens."

F. H. CRITTENDEN,
Bureau of Entomology.

New York City,

EDITOR AMERICAN FORESTRY.—The Legislative Drafting Department, attached to Columbia University, is at present investigating the question of restrictive legislation for the preservation of forests in New York where the maintenance is necessary for the protection of mountain sides, or for the existence of springs and streams, or for the prevention of erosion or floods. We should

greatly appreciate your assistance if you could give us any information concerning, or direct us to, any such or similar legislation that has been proposed, or recommended, or already enacted in any of the states.

LEGISLATIVE DRAFTING RESEARCH FUND.

"The question raised by this request is almost as broad as the whole subject of forest legislation, for the various reforestation acts and fire protective measures of whatever sort have for their purpose the protection of soil from erosion, prevention of floods, and the like, though they do not express it in so many words. The nearest approach to restrictive legislation of this sort would be those laws concerning the establishment and management of state or federal forest reserves such as have been passed by Massachusetts, New York, Pennsylvania, Minnesota, and Wisconsin, and the Federal Acts of June 4, 1897; May 23, 1908 and March 1, 1911, to mention the principal ones. So far as restrictive legislation, which applies to all forest lands, private as well as state, no state has as yet such a law on its statute books, although legislation of this character has at different times been under consideration in the States of Vermont, New York, Mississippi, Louisiana, and California. I will call your attention in this connection to an opinion submitted to the Senate of Maine by the Supreme Judicial Court of Maine on March 10, 1908 (103 Maine, 506), upon certain questions concerning the power of the Legislature to restrict and regulate the cutting of trees on wild or uncultivated land by the owner thereof, in order to regulate waterflow, in the interest of the general public. While the opinion of the court was favorable, no action, so far as I know, has resulted. Messrs. Gifford Pinchot and Overton W. Price have recently completed a very careful study of the forest conditions in the Adirondacks for the "Camp Fire Club," and in connection therewith went into the subject of restrictive legislation very thoroughly. I would therefore suggest that you consult them concerning further data.

I would suggest that the Forest Service is engaged in making a compilation of the forestry, timber and tree laws of all the states and that copies for such states as are now available or which may become so from time to time in the future will gladly be supplied them, provided they should have a special need for such a compilation. The number of copies for each state are only so many as can be made by one set of carbons on the typewriter. Their distribution has therefore generally been limited within the state to which they applied, and they are usually sent only to such persons or

institutions as are more than passively interested in forest legislation."

LOUIS S. MURPHY.

Acting Chief of State Cooperation Forest Service.

MR. N. T. DOWLING,

Legislative Drafting Research Fund,

Columbia University, New York City:

Dear Mr. Dowling.—In reference to your recent request for information for the Legislative Drafting Research Fund of the University, I am appending the following opinion, given by Mr. Louis S. Murphy, of the Forest Service. I hope this will be satisfactory.—*Editor.*

Pottsville, Pa.

EDITOR AMERICAN FORESTRY.—I am inclosing in a small bottle some insects found on my maple trees. Please tell me what they are.

S. M. ENTERLINE.

The insects inclosed in a vial consist of two species. The most abundant form is the Norway Maple aphid, *Chaitophorus aceris*. Another species represented by one specimen is a tingitid, or lace-bug. The former species is undoubtedly the one causing the in-

jury to the maple leaves. This species has been very abundant over the eastern part of the United States during the past cool spring and summer, causing considerable injury to maple trees in some localities. Their habit of gathering on the leaves where they breed in extreme numbers, sucking the sap from the foliage and causing it to curl and turn brown, has attracted much attention. At the present time, however, very little complaint is experienced, as the insect has become well under control of its natural enemies and has, to a large extent, disappeared, owing, probably, to this cause and to the hot weather of the later summer. Trees are rarely killed by his pest, although at times appearing seriously injured and, as the insect rarely occurs in numbers for two successive years in a given locality, it is unlikely that remedial measures will be required.

Should it appear a second year, an application of whale-oil soap at the rate of five pounds to fifty gallons of water to the under surfaces of the leaves by means of a spray pump will prove effective in its control.

F. H. CHITTENDEN,

In Charge Bureau of Entomology.

BOOK REVIEWS

FORSTAESTHETIK. HEINRICH VON SALISCH.
THIRD EDITION. ILLUSTRATED: VII+434
PP. JULIUS SPRINGER, BERLIN. 8 MARKS
(\$2.00); POSTAGE, EXTRA.

Foresters, landscape architects, educators and all those who wish to bring about the highest forms will welcome the third edition of a classical work on one of the most fascinating branches of forestry.

The first edition of *Forstaesthetik*, or Forest Aesthetics, appeared as a small duodecimo volume in 1885; the second, much enlarged and improved, in 1902. The third, 1911, is still broader in its scope and has been re-enforced by twelve new chapters and sixty additional illustrations.

Part I deals with fundamental principles; Part II discusses their practical application. Each part is divided into two sections. Section A of part I embraces a discussion of terms and fundamental ideas, justifies the consideration of aesthetic values in practical forestry, and determines the position of forest aesthetics in the curriculum of forest schools. Section B of part I gives us an insight into the components of the forest as elements of beauty and lets us understand how effects of a higher order are produced by their combination. The discussion aids us to appreciate the beauty of expression of trees and woodland veg-

etation, the scenic values of mountain, valley and plain, the character of rocks, the fauna and flora of the forest, light and shade, color, sound and all that appeals to our senses and the imagination in the atmosphere of the forest. This section includes some references to American species that have been introduced into Germany. (p. 121.)

Part II is likewise divided into two sections. In section A the ideas set forth in part I are applied to the actual work of the forester, to the construction of road systems and the several systems of management, including the questions of rotation, compartments, thinning, pruning and regeneration.

Finally, in section B of part II the author goes a step further and discusses the possibility of forest "adornment" by way of the beautification of roads, openings, views, the preservation of historic landmarks and individual old trees, etc. He is careful here, as in other passages of the book, to make a careful distinction between the economic forest and the park.

From the preceding outline the reader will conclude that this is not a mere theoretic or philosophic inquiry. He will find throughout this book a thorough and masterly treatment of the subject. He will find that both theory and practice have been

given full consideration. The scenic value of trees and forests and the intimate relation that forest aesthetics bears to practical forestry are matters, it will be admitted, that have hardly, thus far, been clearly understood or even considered by the average forester. This neglect may be due to force of circumstances—the forester, indeed, needs about all his strength and nerve to cope with the problems that immediately confront him—or the condition may be the result of that common impression, though false, that forest use and forest beauty are incompatible, and that these are matters that should be handed over exclusively to the landscape architect and the lover of nature. Such readers, if there are any, will find a strong argument to the contrary in the opening chapter of this book.

The main object of the author is to show the feasibility of a practical application of his researches to economic forestry. He endeavors to prove that beauty and use can be made not only to harmonize, but that each is complementary to the other and that forest aesthetics is, in fact, an essential and indispensable part of the highest development of forestry. A marked characteristic of the work are the ample explanations and analysis of the ideas that are advanced, and the innumerable citations from the writings of other authors.

The author's thorough knowledge of aesthetics as well as of forest science in all its branches, his excellent taste and insight, and the actual application of his ideas, carried out by himself during the past thirty-five or forty years on his own forest estates in East Prussia, have given him a wide and thorough grasp of the subject. It is a mark of the highest commendation that the Prussian government has recently provided for the introduction of this work into the libraries of all its forest reserves, some eight hundred in number, besides thirty others in those of the Province of Alsace and Lorraine.

The illustrations are clear and suggestive although one regrets the absence of the attractive heliotypes that were included in the second edition. The exclusion in the present edition appears to have been necessary to keep the price of the book within reasonable limits. An American or English reader might urge the desirability of some condensation in form and substance. Yet when these and minor objections have been made the essential excellence of the work remains and it will take its place as one of large scope and usefulness in the literature of forestry.

While it is true that much in this book is applicable mainly to European forest conditions and particularly to those of Germany, it is very rich in suggestions for the American forester and many of the measures explained might even today be applied with us, where conditions and opportunities are

in many respects even more varied than those of Europe.

FORESTRY. BY PROF. HERMAN H. CHAPMAN; CLOTH \$1.25, POSTPAID. PUBLISHED BY THE AMERICAN LUMBERMAN, CHICAGO, ILL.

This is one of the most valuable of the essentially practical publications on forestry, because it obtains a great store of information which can be read with interest and readily assimilated by lumbermen, timberland owners and others who with little or no technical knowledge of the subject desire plain, clearly understood information upon it. No forester in the United States is better fitted for writing such a book than Professor Chapman, and each chapter is full of logical statements of the progress of forestry in this country. The first part of the book treats of the growth of the different species, tells of the influences of the seasons and the latter temperature; another section deals with natural reproduction and tells how it may be encouraged. Silviculture, forest mensuration, taxation, fire protection and prevention are all discussed in a manner which cannot fail to be interesting to the reader and student. In fact there is no phase of forestry which is overlooked and the book should be in the hands of every lumberman, timberland owner, student and all lovers of trees and advocates of forest conservation.

IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES, including a discussion of the Structural and Physical Properties of Wood, by Samuel J. Record, Assistant Professor of Forest Products, Yale University, 1912. 8vo, vii +117 pages, text figures 15, half-tone plates 6, New York, John Wiley & Sons. Price \$1.25.

Students and teachers of forestry will welcome this little book, which deals in a very clear and detailed manner with the structural and physical properties of the commercial woods of the United States. It is designed primarily as a manual for students of forestry, yet with a little study of the text and illustrations laymen will find it advantageous in the identification of our native woods. Other published information on the North American woods is very limited and scattered. Forest Service Bulletin 10, entitled "Timber," by Professor Roth, is the only publication that directly approaches this work in character. Professor Record's book is not only an amplification of information contained in this bulletin, but it embodies also much additional material of interest and practical importance.

About one-third of the text is devoted to the anatomy of the woods of both conifers and hardwoods. This includes a discussion of the gross features of the stem from pith to bark inclusive, and the microscopic

features of the secondary wood. Sufficient detail is given to make the subject clear and comprehensive. This part of the text contains practically all of the information essential in the use of the key for identification of woods. For further detail and research the reader is directed by an extensive bibliography to other works on the subject.

A discussion of the physical properties of wood comprises another one-third of the text which together with the structural qualities already mentioned constitutes part I. Under the physical properties attention is given to density, water content, shrinkage, hygroscopicity, penetrability, conductivity, resonance, color, gloss or luster, scent or odor, and taste, giving the relation of these properties to the usefulness of wood and to their adaptability to some extent as aids in identification. Where so much is excellent as the detailed discussions of the chapters above referred to, it may seem ungracious to suggest possible improvements; and yet one can not but regret that the author omitted under this part a general consideration of the mechanical and chemical properties of wood, both of which are very important in determining the usefulness of wood. Flexibility, toughness, and cleavability are features of invaluable assistance in identification. Yet the book gives quite as much as can be mastered by the student of forestry in the time usually allotted to the subject. As is almost unavoidable in the first edition of a work of this kind, a few omissions of words may be noted,

and some typographical errors have crept in.

Part II is a key specifically identifying almost 100 woods; others as the pines, firs, oaks, hickories, and poplars have not all been separated into species because they do not present sufficient apparent structural differences. However, by knowing where a piece of wood originated, the distribution area indicated after each species, may help in separating a species from a group. The key is far more detailed and comprehensive than any other yet devised for American woods. It is upon this part of the book that the author has spent his force, and in the main he has accomplished a most admirable task. The distinctions in the key are based on gross features as far as is practicable, a hand lens and a sharp knife constituting the only equipment necessary to distinguish most of the species. Quite often, however, the author found it necessary to add microscopic features to distinguish two or more closely resembling woods. The writer has tried out the key on a large number of woods, and found it clear and correct in every case.

Thirty excellent reproductions of photomicrographs of sections of native woods are added as aids to the key. The illustrations in the text are mostly diagrammatic drawings, and they serve the purpose much better than photographic reproductions.

The many references cited by the author show his broad range of study, and are a wonderful time-saver to the student engaged in further research.

A. K.

PRIZES FOR CANADIAN SEED GROWERS

The Canadian Seed Growers' Association (address, Ottawa) gives notice that prizes in the form of cash and special trophies are offered for seed grown in the Province and exhibited at the next annual winter fair or Provincial Seed Exhibition. The date of this exhibition will be made public later.

MR. SEWALL'S ACTIVITIES.

Messrs. Kenneth M. Clark and James A. Connors, of the forestry staff of James W. Sewall, Old Town, Maine, have gone into northern Maine to take charge of the mapping, surveying and exploring of a large tract of land for the Great Northern Paper Company. Mr. Sewall is on a short trip in the upper Penobscot region of Maine, in the interests of one of the timberland owners of that State. Last year Mr. Sewall had charge of the complete mapping, estimating and surveying of approximately 500,000 acres of land, in both Canada and the United States.

MacMILLAN INSPECTING.

H. R. MacMillan, who was appointed to the position of Chief Forester for British Columbia, recently visited the Sooke, Goldstream and Cowichan district on Vancouver Island, in order to see how the work of forest protection was progressing there. He was accompanied by Mr. H. K. Robinson, the chief of the surveys branch of the forestry department, Divisional Fire Warden Markland, and District Fire Warden Bittancourt.

EDUCATIONAL

Of all the five Pacific Coast timbered states there is not one which possesses greater natural advantages for maintaining a live, practical, well-equipped school of forestry than does California—a state of unlimited resources, a wonderfully rich and progressive state, that in most matters is foremost in a policy of aggressive development, and alert to the best interests of its citizens. This brings out in more striking contrast its short-sighted policy in the lack of forestry school in connection with its university. The nearest approach to it of which the university can boast, is the Forestry Club, organized by a body of its members, who are putting forth herculean efforts to promote the movement toward the establishment of a forestry department at the university, through conducting a publicity campaign and bringing all the support they can to securing a state appropriation for the department. The State of California ranks third in its amount of standing timber; there are 28 millions of acres in the National Forests in which practical forestry is being conducted; has nearly a half-million acres of delinquent tax land, much of which will develop into state forests; it also has much logged-off land that is fit only for reforestation. There is, and will be for many years to come, an unsupplied demand in the state for trained foresters, skilled logging engineers, and expert knowledge of

the entire operation from tree to finished product. But it takes money to maintain such training schools, and in a state where lumber is one of the main industries, contributes so large a volume of taxes for its support, and is the paramount community builder, it is the duty of the state to help supply the technical training needed in this industry, by making an appropriation that will build, equip, and maintain an adequate forestry department in connection with its university.

Boys' Forestry Camp

The New York State College of Forestry at Syracuse University is to maintain a forestry camp for boys at Saranac lake next summer. "This will not be a 'kid glove' deal, but a real educational proposition which will give boys of, say, between 15 and 20 years of age, practical experience in forest life," says Dean Baker. "It will cure a lot of them of the forestry bee, and at the same time fix a love of scientific forestry in the minds of others." The tuition and board will be small enough so that boys whose families are in moderate circumstances can afford to join the camp. "We will teach a great deal of woodcraft, some forestry and a little botany and geology," the dean added.

LUMBER ASSOCIATIONS INTERESTED.

The National Hardwood Lumber Association, with headquarters in Chicago, with 800 members; the National Wholesale Lumber Dealers' Association, with offices in New York, with 425 members, and the West Coast Lumber Manufacturers' Association of Washington State, with 129 members, have now been elected to membership in the Chamber of Commerce of the United States of America.

THE PROUD BOAST OF MEMPHIS.

Declaring that Memphis holds undisputed title to supremacy as the leading hardwood lumber market of the world the Committee on Statistics of the Memphis Lumbermen's Club has compiled an interesting report on the lumber situation here in 1911.

RAILWAY REGULATION TO PREVENT FOREST FIRES.

Order 16570 of the Dominion of Canada Board of Railway Commissioners covers the method of equipping locomotives so as to prevent them from being a cause of forest fires, and at the same time lays down the liabilities and requirements of railway companies in the event of such a conflagration occurring.

A LARGE PURCHASE.

The Laurentide Company, Ltd., Grand Mere, P. Q., have purchased a large tract of territory consisting of 398 miles of forest, from the Calvin and Power Companies, on the Upper St. Maurice river. The Laurentide Company already own over 400 miles of territory in the district. An addition to the sulphite mill is being erected by the directors.

NEWS AND NOTES

The Cannon Ball Tree

One of the most remarkable plants in the world is the cannon ball tree, to be found in British Guiana. The natural height of the tree reaches to eighty or a hundred feet or even taller. The fruit is a hard globular capsule, seven inches or more in diameter, containing numbers of flat, circular seeds rather larger than a dime. It resembles a thirty-two pound shot, is brown in color and very rough.

Famous Pine Gone

The famous De Lancey pine in the Zoological Park, New York, one of the most widely known trees in the East, has been cut down. The tree stood within the boundaries of the New York Zoological Park. It was 150 feet high, and could be seen for a long distance. The pine, according to Mr. Merkle, forester of the New York Zoological Society, died from old age. By actual count of the rings the tree was 260 years old.

"The pine had been dying for the last fifteen years or more," said the forester yesterday, "and it was a source of danger. A large part of the trunk has been left standing, and ivy will be planted beside it so that at least that part can remain as a reminder of its historic significance."

Under the historic pine was reared a mansion presided over by one of the De Lancey family, Colonel James De Lancey, of the Westchester Light Horse, who was High Sheriff from 1770 to 1777, and who sided with the King. He was the son of Peter De Lancey, known as Peter of the Mills.

Watching for Forest Fires

The newly-established fire observation on Mount Pisgah is doing good work and already some thirty forest fires have been discovered. The attention of the fire warden of the town where the fire was in progress is in each case called to the facts and by the timely observation was soon under control.

The observer on the tower is Ira Chase and he is a man well-fitted for the work in which he takes a great interest. The present tower is situated upon the top of a high pine tree, on the summit of the lofty rise of land known as Mount Pisgah.

Mr. Chase is supplied with a chart of the surrounding country and he is connected with the world by telephone, so that he can get into communication when occasion de-

mands. The towns over which he is keeping watch are Amherst, Bedford, Brookline, East Ridge, Greenfield, Greenville, Hollis, Lyndeborough, New Boston, New Ipswich, Mason, Merrimack, Milford, Mount Vernon and Wilton.

The following Massachusetts towns have asked to be taken in under this supervision and this has been done: Ashby, Ashburnham, Townsend, Pepperell and Winchendon. The entire district is in charge of Fire Warden Worcester L. Winslow, who for thirty years or more has been connected with the Milford department for fighting fires, and is one of the most skilled fire fighters in the State.

Trees to Check Floods

The New York Commercial says: "When Congress comes to consider the problem of checking the spring floods in the Mississippi Valley, the reforestation of the hills and mountains in the valleys of the Ohio and its tributaries will no doubt receive much attention. In these regions are the former sources of supply of our most valuable hardwoods, the growing scarcity of which is threatening the prosperity of many important industries. Hardwoods are superior to pines, firs and spruces, for forest reserves, because they are less liable to be devastated by fire. Extensive fires in hardwood forests are practically unknown and are easily checked and put out with little damage; but a fire will race through the tops of pine trees as fast as the wind can carry it, and in many cases man is helpless and only rain can stop the loss. Scientific planting with areas for fire breaks free from pine or other coniferous trees could be introduced where the soil is not suited for hardwood, but the demand for the latter is more pressing for industrial purposes."

Remarkable Trees

There are being brought to the United States Plant Bureau seeds of two rather remarkable trees.

One seed comes from the southern part of the Island of Luzon in the Philippines. It is from the pill nut tree, and is said to be extraordinarily rich in flavor. The tree is a very large one, and the Americans in the Philippines think the nut is the finest grown. If a lighted match be held to a nut when roasted it will burn like a lamp, so rich is it in oil.

The other tree is found on the Isthmus of Panama and is one of the most interest-

ing trees of the tropics. It is called the candle tree, and it is quite worthy of its name, for when its fruit is ripe its branches appear as though covered with candles, for all the world like an old-fashioned Christmas tree.

A New Surrender Tree

The famous old apple tree near Appomattox Courthouse, Virginia, under which Lee surrendered to Grant, long since carried away piece by piece by souvenir hunters, is to be replaced by a tree planted by Woodrow Wilson, Colonel Armes, U. S. A., owner of the Appomattox farm announced that the Democratic presidential nominee had accepted an invitation to visit the historical place to plant the new tree within the next few weeks.

National Forest Changes

President Taft has just made considerable changes in national forests in Montana, Arizona, Nevada, Utah, and California through presidential proclamations modifying the boundary lines. By these changes nearly 275,000 acres of land are eliminated from the forests, about 65,000 acres are added, and about 55,000 acres are transferred between two forests, while a new forest is created by the division of an old unit into two.

The net result is to bring down the total gross area of the national forests to about 187,400,000 acres, of which nearly 27,000,000 acres are in Alaska. To a considerable extent, however, the reduction, so far as land actually owned by the government is concerned, are apparent rather than real, owing to heavy alienations in the tracts eliminated. Some 22,000,000 acres of the national forest gross area are not owned by the government.

Japan is Years Ahead

Just at the time when this country is beginning to struggle with the problem of husbanding its forest resources, of protecting its mountain slopes, and of improving the waterways, it is interesting to know that the Japanese have successfully attacked the same problem, before the land suffered severely from the evil effects following deforestation. The far-sighted people of Nippon have foreseen results of the destruction of their extensive mountain forests, and have safeguarded themselves by placing all of these under government control.

The practice of forestry has been carried on in Japan for a longer time than in any other country. For 1,200 years the people of Japan have been planting and growing forests, with a success that has been a little short of marvelous. Under careful manage-

ment, the Japanese forests yield very high financial returns. This high yield is only made possible by the close utilization of every bit of the trees so that scarcely a twig is wasted, and by the improvement of the growth of their forests by carefully conducted thinning and tending. The woods are first thinned at the age of thirteen years, and then every five years after that up to the time of the final harvest, at 120 years.

Seeking German Bugs

Germany's forests are being searched by the officials of the American Forestry Service for ichneumon fly eggs. It is purposed to breed these flies in American forests in the hope of killing off gypsy moths.

The ichneumons lay eggs in the larvae of other insects, especially of the gypsy moth, and it is hoped that they will rid the United States of these pests.

Sequoia Sempervirens

Walter B. Parks, of the California Nursery Company of Niles, Cal., writes to AMERICAN FORESTRY as follows: On page 414, June issue, you speak of transplanting young trees of *Sequoia gigantea* from our State Redwood Park in Santa Cruz County to Florida. There are no native trees of *Sequoia gigantea* within a hundred miles or more of there as the only *Sequoia* in the Coast Ranges is *Sequoia sempervirens* or "Redwood," the *Sequoia gigantea* or "California Big Tree," as it is commonly called here, growing naturally only in the Sierra Nevadas. So if the trees came from the State Redwood Park or "Big Basin" they are, of course, *Sequoia sempervirens*.

Conserving Alabama's Forests

Alabama contemplates the enactment of measures conserving the forests, mines, waterways, and other kindred natural resources and Commissioner John H. Wallace, Jr., has written to the Secretary of Commerce and Labor for Federal Statutes and State Laws bearing on the subject. In answer to him Philip P. Wells, chief law officer of the U. S. Reclamation Service, has sent him general information on the subject, and in addition says:

"Further information may be obtainable from the columns of AMERICAN FORESTRY, the organ of the American Forestry Association, Maryland Building, this city.

"There has been much activity by the states in forest legislation, and some in other conservation legislation. Most of the advanced State forest laws have been drafted in co-operation with the United States Forest Service. Such a law was

drafted for Alabama in 1907, if I remember the year correctly. Similar laws have been drafted and enacted in Maryland and Tennessee, and you could probably secure the text by writing to the proper authorities in those States. I think the same is true in Louisiana. The New York State Library published for many years an annual bulletin entitled 'Review of State Legislation.' The Review was arranged by subjects among which was Forestry and, I think, Fish and Game as well as other phases of conservation. Under each of these topics there was a summary of the legislation in all States on that topic for the year in question. You will find this a valuable guide for your purposes. Presumably the text of the laws there summarized may be found in your State Library." Library."

Pacific Logging Congress

At a recent meeting of the Pacific Logging Congress at Tacoma, Wash., the following resolutions were passed:

"The Congress believes that the growing of timber is a National and State function and each state should make a careful examination of its cut-over lands unfit for agricultural purposes and better adapted for reforestation, with a view of purchase through condemnation or otherwise, and proceed to the creation of State and National forests.

"The Pacific Logging Congress believes in the expenditure by the various states and provinces of liberal and adequate appropriation for forest fire protection. To this end we endorse the efforts being made for the creation of field military posts near the National forests, with a view of utilizing the National troops when emergencies arise in the protection of the National forests from fire."

Railroad Reforesting.

The Delaware & Hudson Railroad has now taken up the problem of reforestation. C. S. Sims, Vice-President and General Manager of the company, is devoting much of his personal attention to reforesting the lands owned by the company throughout the Adirondacks and the coal region. The Delaware & Hudson Company has a well established nursery on the grounds near Hotel Champlain, and more than 3,000,000 seedlings are being cultivated there. The company

owns 200,000 acres of land in the Adirondacks and coal region, which are in process of planting with trees. More than 600,000 trees will be planted this year. In the Adirondacks Scotch pine will be planted, and in the coal region red oak.

This extensive work conducted by the Delaware & Hudson Company will not only have the practical effect of immediate advantage but also has much educational force as an example to be imitated. With large corporations leading the way in this manner, and with the rising generation instructed through textbooks and the object lessons of Arbor Day, there should be a great impulse given to that very vital and essential phase of conservation of natural resources which is represented by the planting of new trees to take the place of those which have been consumed by the needs of a growing country.

Enforcing Plant Quarantine.

Preparations are being made by the Department of Agriculture for the immediate enforcement of a part of the national plant quarantine law just passed by Congress. The bulk of the provisions of this quarantine law will not be enforced until October 1, but provision is made for the immediate enforcement of the restriction against the importation of plants liable to harbor the Mediterranean fruit fly. This will affect the importation of orange and lemon stock from the Mediterranean region.

The United States until recently was the only first-class power that had not a national plant quarantine law, and efforts have been made by the Department of Agriculture for several years to get such a law enacted. Several of the individual states have effective quarantine laws and efficient inspectors, and through co-operation it has been possible to head off a number of plant shipments that would have been highly injurious. About two years ago there was a large shipment of nursery stock from France that was infested with nests of the brown-tailed moth. Through the State inspectors 800 parcels were found and destroyed in thirty-six different States. The enforcement of the new law will be under a commission of five experts of the Department of Agriculture, who were appointed recently.

They are C. L. Warlatt and A. F. Burgess, of the bureau of entomology; W. A. Orton, plant pathologist; Peter Bisset, bureau of plant introduction, and George Sudworth, of the forest service.

STATE NEWS

Massachusetts

The watch for forest fires in this state—The Boston Chamber of Commerce News is impressed with the results already obtained through the system of forest fire prevention which followed last year's appropriation of \$10,000 for a forest fire warden. It is believed that the difference between \$500,000 and \$30,000 represents the saving of forest property in Massachusetts in the year. State Fire Warden Hutchins is in charge of the work, assisted by 14 men, one at each of the stations in operation. Before the stations were established last year the damage by forest fires amounted to \$501,944, while during the same period this year the damage reported was only about \$30,000.

Ohio

"We must either reforest our denuded acres in Ohio or build cyclone cellars to provide safety from the windstorms that are becoming common in the state."

This is the conclusion of A. P. Sandles, secretary of the Ohio State Board of Agriculture, after a careful investigation of storm damage through the state during the present year.

Sandles, who always is digging through the facts connected with agriculture in the state, is strong for more trees. He is firmly convinced that, with thousands of acres of trees growing, there would be less storm damage, more surplus moisture stored up in the earth for the benefit of the growing crops and a better condition generally for all the people. His first advice is to plant trees. If he has anything further it would be to keep on planting trees.

"The storage of surplus moisture for the growing crops is largely dependent on the timber area about the headwaters of streams and near the farms," Sandles claims. He insists that, with more trees in the state, there would be more and better corn, oats, wheat and hay and even the high cost of living would be given a fatal thrust if the trees were planted and natural conditions for this climate restored.

"The state ought to have thousands of acres of new growing trees planted next year, he says. We ought to increase the acreage of trees planted every year until the denuded hills again are covered with the trees that were supplied by nature when the country was wild. With that will come the restoration of natural conditions and the state will be much more prosperous. Plant

the trees, fertilize the acres that have yielded uncomplainingly for over a century, use sound judgment in the rotation of crops and Ohio will again produce a score of bushels of wheat per inhabitant and the question of the high cost of food stuffs in that line, will have been settled."

Washington

Campers who carelessly start forest fires in Washington state will be prosecuted. They ought to be prosecuted, and they ought to be convicted and punished in all cases where the proof shows that a lack of care on their part is responsible for forest fires.

Annually, during the dry season, forest fires cost the state of Washington millions of dollars. Forest fires exact a more precious toll in human lives also. Not infrequently, too, homes are swept away, and it is all because of a lack of care and caution on the part of persons who frequent and use the woods of this state.

It is easy to guard against forest fires. When citizens break camp they should not leave any fire behind them. By the use of water or dirt they can extinguish the camp fire; it will take only a few minutes to do it, and if campers will stop long enough to think that they may thus save millions of dollars in property values and at the same time prevent many hardships, and possible tragedies, they will not begrudge the time spent in this way.

Kentucky

Under the Federal statute providing \$200,000 annually for the purpose the United States Bureau of Forestry will co-operate with the Kentucky State Forestry Commission. Either Chief Forester Graves or Assistant Forester Greeley probably will visit the State Commission in launching its work.

A statement to this effect was made by Governor James B. McCreary after he had had a lengthy interview in Washington with the United States Chief Forester and his first assistant. It is believed that either J. E. Barton, a native of Michigan, whose wife was a Princeton girl, or a Mr. Lafon, native of Mercer County, both now in the government forestry service, will be appointed Kentucky Chief Forester by Governor McCreary following his return to Frankfort.

Massachusetts

To encourage the reforestation of Essex County is a task on which W. P. Dillingham is now at work. He is assistant secretary of the Massachusetts Forestry Association, an organization that hopes to have 1,000,000 acres of now waste land planted to trees.

Mr. Dillingham would have each town and city convert the waste land about it into a forest, and thus insure fuel and building material for the future. He declares that each town could actually net from \$3 to \$5 annually from each acre of such forests and backs up this statement with figures showing that Baden, a European city, with a population of 16,000, has a forest of more than 10,576 acres, which nets \$6.25 per acre each year, while Zurich, Switzerland, is said to clear \$12 per acre annually from its town forest.

"Our manufacturers," says Mr. Dillingham, "are paying from \$2 upwards more per thousand feet for timber imported from other states than they have to pay for the home grown product. If our now waste land was put under silviculture, it would increase the lumber industry in the state by an amount netting from three to five millions of dollars annually and furnishing employment to thousands of our citizens."

Florida

On the grove of O L. Whidden, one of the prosperous fruit growers out east of Arcadia, are to be seen some grape-fruit trees of immense size. These trees were planted nearly forty years ago. They measure from sixteen to twenty-four inches in diameter and from six and seven feet in circumference. The trees bear each year from twenty-five to forty boxes of delicious fruits. Located as they are, and being old and hardy, they went through the freeze of '94 and '95 without any material damage.

Texas.

The Etude Club, composed of the leading society women of Denison, will go down in history as the first organization of women in Texas to take up the plan, originating at Sapulpa, Okla., for the planting in Texas of pecan or other nut bearing trees along the right-of-way of the Canada-to-the-Gulf highway, which will extend from Winnipeg, Canada, to Galveston, Texas, passing through the various places of interest and principal cities of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas, and will rival in symmetry, length and beauty, when completed, any public pike in the world.

The magnificent highway will follow closely the banks of the beautiful Red River of the

North, and will have the distinction, too, of crossing the Red River of the South at Denison, which is the largest Southern tributary of the Mississippi, the Father of Waters. The great transcontinental boulevard will also follow along the Missouri River, where the landscape is unsurpassed, beginning its stretch across Oklahoma at Caney, Kan., thence to Denison, Tex., where its course will be wended to the balmy waters of the Gulf of Mexico at Galveston, entering that delightful Southern port over the new concrete causeway.

New York

Oscar Bravo, a representative of the Chilean Government, who is making a tour of the United States and various other countries for the purpose of securing information relative to Forestry matters, has called on the New York State Conservation Commission. Commissioner Bravo secured a large fund of valuable information in regard to New York State's forestry work, which is far in advance of sister States. The Chilean representative was so well pleased with what he learned here, that he decided to make a tour of the Adirondacks to look over the State lands, nurseries and reforestation operations. He is especially interested in New York's forest fire protective system and will give that careful study.

Fish and Game Commissioner of Alabama John H. Wallace has written the Conservation Commission of New York State advising it that the State of Alabama "contemplates the enactment of measures conserving the forests, mines, waterways and kindred natural resources," and that it has in view "the creation of a conservation commission to have supervision and charge of all matters relating to the natural rights of our people." He asks the New York Commission for copies of the New York State Laws bearing on this matter. The request was cheerfully complied with.

Oregon

A Salem (Ore.) dispatch says: "Lightning, according to advices received by the Forestry Department, has been a great factor in producing forest fires this season. Advices received today from field men in Klamath County state that five fires were started during the last storm there, and advices from Eastern Oregon say that many were started there in the same way. The wardens, however, had but little trouble in controlling them, and little damage was done. So far the damage resulting from forest fires has been light."

CURRENT LITERATURE

MONTHLY LIST FOR AUGUST, 1912.

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Proceedings of associations

Royal Scottish arboricultural society. Transactions, vol. 26, pt. 2. 120 p. Edinburg, 1912.

Forest Education

Ellis, Don Carlos. A working erosion model for schools. 11 p. il. Wash., D. C., 1912. (U. S.—Dept. of Agriculture—Office of experiment stations. Circular 117.)

Arbor day

Illinois—Dept. of public instruction. Arbor and bird day, 1911. 96 p. il. Springfield, Ill., 1911.

Forest Legislation

Belfield, H. Conway. Report on the legislation governing the alienation of native lands in the Gold Coast colony and Ashanti; with some observations on the "Forest ordinance." 1911. 121 p. London, Published by His Majesty's stationery office, 1911.

Kalbfus, Joseph, ed. Commonwealth of Pennsylvania; digest of the game, fish and forestry laws, 1911. 290 p. Harrisburg, Pa., State printer, 1911.

Silvics

Studies of species

Phillips, Frank J. Emory oak in southern Arizona. 15 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 201.)

Silviculture

Planting

New Zealand—Dept. of lands. Report on the dune-areas of New Zealand, their geology, botany, and reclamation; by L. Cockayne. 76 p. pl. Wellington, N. Z., 1911.

Pruning

Selby, A. D. Dressings for pruning wounds of trees. 8 p. Wooster, O., 1912. (Ohio—Agricultural experiment station. Circular 126.)

Forest Protection

Insects

Chestnut tree bark disease conference. The conference called by the governor of Pennsylvania to consider ways and means for preventing the spread of the chestnut bark disease. 253 p. pl. Harrisburg, State printer, 1912.

Hopkins, A. D. Damage to the wood of fire-killed Douglas fir, and methods of preventing losses in western Washington and Oregon. 4 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Bureau of entomology. Circular 159.)

Stebbing, E. P. The bark-eating and root-boring beetles of the babul, *Acacia arabica*. 9 p. pl. Calcutta, 1912. (India—Forest dept. Forest bulletin No. 12.)

Webb, J. L. A preliminary synopsis of Cerambycoid larvae. 7 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Bureau of entomology. Technical series no. 20, pt. 5.)

Lightning

Stahl, Ernst. Die blitzgefährdung der verschiedenen baumarten. 75 p. Jena, G. Fischer, 1912.

Forest Management

Hawley, Ralph Chipman, and Hawes, Austin Foster. Forestry in New England; a handbook of eastern forest management. 479 p. il., maps. N. Y., J. Wiley & Sons, 1912.

Mulford, Walter. The improvement of the woodlot. 24 p. il. Ithaca, N. Y., 1912. (Cornell reading-courses, vol 1, no. 12; farm forestry series, no. 1.)

Secrest, Edmund. Co-operative forestry work. 3 p. Wooster, Ohio, 1911. (Ohio—Agricultural experiment station. Circular 119.)

Forest Administration

United States—Forest service. July field program, 1912. 29 p. Wash., D. C., 1912.

National and state forests

United States—Forest service. The Crater national forest. 6 p. map. Wash., D. C., 1912.

United States—Forest service. National forests; location, date, and area, June 30, 1912. 4 p. Washington, D. C., 1912.

Forest Economics

Statistics

Macmillan, H. R. Forest products of Canada, 1911; pulp wood. 17 p. Ottawa, 1912. (Canada—Department of the interior—Forestry branch. Bulletin 30.)

Forest Utilization

Lumber industry

National lumber manufacturers' association. The American lumber industry; official report, 10th annual convention. 238 p. Chicago, Ill., 1912.

Wood-using industries

Armstrong, Andrew K. Wood-using industries of California. 114 p. pl. Sacramento, Cal., 1912. (California—State board of forestry. Bulletin 3.)

Dunning, C. W. The wood-using industries of Idaho. 4 p. Seattle, Wash., Pacific lumber trade journal, 1912.

Wood-preservation

Winslow, Carlile P. Commercial creosotes, with special reference to protection of wood from decay. 38 p. il. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 206.)

Auxiliary Subjects

Botany

Brush, Warren D. The formation of mechanical tissue in the tendrils of *Passiflora caerulea* as influenced by tension and contact. 25 p. il. Chicago. Univ. of Chicago, 1912.

Clements, F. E. and others. Guide to the spring flowers of Minnesota. 2d ed. 40 p. Minneapolis, 1910. (Minnesota Geological and natural history survey. Minnesota plant studies, no. 1.)

Clements, F. E. Guide to the trees and shrubs of Minnesota; 2d edition. 30 p. Minneapolis, 1910. (Minnesota—Geological and natural history survey. Minnesota plant studies, no. 2.)

Clements, Frederic E. Minnesota mushrooms. 169 p. il. pl. Minneapolis, 1910. (Minnesota—Geological and natural history survey. Minnesota plant studies no. 4.)

Correa, M. Pio. Fibras texteis a piteira gigante. 15 p. il. S. Paulo, Brazil, Ministerio da agricultura, industria e commercio, 1912.

Correa, M. Pio. Plantas fibrosas da restinga do estado do Rio de Janeiro. 67 p. pl. Rio de Janeiro, Ministerio da agricultura, industria e commercio, 1910.

Rosendahl, C. O. and Butters, F. J. Guide to the ferns and fern allies of Minnesota. 23 p. il. Minneapolis, 1909. (Minn.—Geological and natural history survey. Minnesota plant studies, no. 3.)

Climatology

Smith, J. Warren. The climate of Ohio. 25 p. il. Wooster, Ohio, 1912. (Ohio—Agricultural experiment station. Bulletin 235.)

Clearing of land

Sparks, H. W. Methods of clearing logged-off lands. 28 p. il. Pullman, Wash., 1911. (Washington—Agricultural experiment station. Bulletin 101.)

Periodical Articles

Miscellaneous periodicals

Agricultural gazette of Tasmania, May 1912.—Tree planting on the farm, by L. A. Evans, p. 165-8.

American newsboy, June 1912.—Domesticating the forests, by Henry Solon Graves, p. 8-9.

Atlantic monthly, July 1912.—Aesthetic value of efficiency, by E. P. Howes, p. 81-91.

Country gentleman, July 27, 1912.—The home acre shade; the best varieties of poplars for ornament and shelter, by Clarence M. Weed, p. 15.

Craftsman, July 1912.—Trees for wind-breaks, by M. Campbell, p. 450-3.

Field and stream, Aug. 1912.—The birches, by Warren H. Miller, p. 424-7.

Gardeners' chronicle, June 15, 1912.—Manuring forest trees, p. 395.

Gardeners' chronicle, June 29, 1912.—*Paulownia imperialis*, by R. Irwin Lynch, p. 431.

Journal of the Linnean society; botany, June 28, 1912.—An investigation of the seedling structure in the Leguminosae, by Robert Harold Compton, p. 1-22.

National geographic magazine, July 1912.—The fight against forest fires, by Henry S. Graves, p. 662-83.

Outing magazine, July 1912.—By the light of the fire, by F. Farrington, p. 488-93.

Saturday evening post, Aug. 17, 1912.—"Farms" in the national forests, by Henry Solon Graves, p. 30-2.

Scientific American, Aug. 12, 1911.—The conservation of the forests; a national duty to protect the 80 per cent of standing timber now in private hands, by Gifford Pinchot, p. 135-7.

Scientific American, supp., June 15, 1912.—Turpentine from dead and down timber, p. 373-4; The commercial development of India rubber, by S. Frankenburg, p. 378.

Trade journals and consular reports

American lumberman, July 13, 1912.—Some

- construction timbers of the Philippines; guijo, by H. N. Whitford, p. 27; Taxation of our forests and forest lands, by C. H. Goetz, p. 30; Getting down timber from African tableland, p. 40-1; Logging methods new and old, p. 42-3.
- American lumberman, July 20, 1912.—Some construction timbers of the Philippines; yacal, by H. N. Whitford, p. 27; Soil fertility and forest fires, by Leo M. Geismar, p. 37; Timber and lumber of the Balkan states, by C. A. Schenck, p. 52-3.
- American lumberman, Aug. 10, 1912.—Some construction timbers of the Philippines; palosapis, by H. N. Whitford, p. 29; Citizens' interest in protecting and perpetuating forests, by E. T. Allen, p. 38.
- Canada lumberman, July 15, 1912.—Private enterprise in fire prevention, p. 32; The making of quartered-oak stock, by Chas. J. Brey, p. 43-4; Application of electricity to logging, by Frank MacKean, p. 46-7.
- Engineering and mining journal, June 22, 1912.—Mining on forest reserves, by Merritt Booth, p. 1215-16.
- Engineering magazine, June 1912.—Cross-ties for preservative treatment; sawed versus hewed ties and the distribution of sapwood, by H. F. Weiss, p. 453-6.
- Hardwood record, July 25, 1912.—Tyloses in wood pores, by S. J. R., p. 29-30; Woods used in measures, p. 35; Transmutation of woods, by S. J. R., p. 39-40; Lumber piling, p. 41-2.
- Hardwood record, August 10, 1912.—Wood growth and properties, by Samuel J. Record, p. 37-8; Broom handle manufacture in sawmills, by H. B. A., p. 38-9; Utilizing minor hardwoods, by Samuel J. Record, p. 39-40; Curly and wavy grain in wood, by Samuel J. Record, p. 41; The true cork wood of India, p. 45.
- Lumber trade journal, July 15, 1912.—Louisiana timber tax placed at one-half of one per cent on gross value, p. 16; Possibilities of increased utilization of yellow pine waste, p. 16-17; A new profession at home for young farmers; agricultural blasting, p. 20-1.
- Lumber world review, July 25, 1912.—Woodworking safeguards for employees, by David Van Schaack, p. 22-3.
- Mines and minerals, July 1912.—Antiseptic treatment of mine timbers, p. 706.
- Pacific lumber trade journal, July 1912.—Timber resources and wood-using industries of state of Idaho, by J. B. Knapp, p. 23-6.
- Paper, July 17, 1912.—Scientific cellulose investigation, by C. F. Cross, p. 17-18.
- Paper, July 24, 1912.—The microscopy of bast fibers, p. 17-22.
- Pioneer western lumberman, July 15, 1912.—The first redwood operations in California, by E. C. Williams, p. 9-13.
- Pioneer western lumberman, Aug. 1, 1912.—Fourth session of the Pacific logging congress, p. 9-21.
- Railway and engineering review, July 20, 1912.—Timber treatment at the Forest products laboratory, Madison, Wis., p. 668-9; Results of treated tie experiments, Gulf, Colo. & Santa Fe railway, p. 671; Building railroads to develop lumber districts in Arkansas, by A. M. Van Auker, p. 678-9; Timber consumption and reforestation, p. 679, 683-4.
- St. Louis lumberman, July 15, 1912.—Alberta's new forest fire laws, p. 22; New uses of sawdust, p. 48.
- St. Louis lumberman, Aug. 1, 1912.—Live stock on cut-over lands, by D. O. Lively, p. 60; The maintenance of power in a logging camp, by R. T. Earle, p. 60-1; Electric logging, by Jas. R. Thompson, p. 61; The tilting dump, by James O'Hearne, p. 61-2; The utilization of logging wastes, by H. K. Benson, p. 62; Loading logs, by O. J. Evensen, p. 62-3; Rough ground logging, by Fred R. Olin, p. 63; Clearing logged-off lands, by Walter H. Graves, p. 63-5; Topographical surveys and logging plans, by H. P. Henry, p. 65-6; The lumbayao of Mindanao, by H. N. Whitford, p. 73.
- Southern industrial and lumber review, July 1912.—Methods for utilization of wood waste, by George Walker, p. 70-1.
- Southern lumber journal, Aug. 1, 1912.—Method of utilization of wood waste, by George Walker, p. 40-2; The taxation of timber lands, by Fred Rogers Fairchild, p. 50.
- Southern lumberman, July 20, 1912.—Plea for yield tax on timberlands, by Fred R. Fairchild, p. 28; Some furniture and cabinet woods of the Philippines; acle, by H. N. Whitford, p. 32.
- Timberman, July 1912.—Utilization of electricity in the lumber industry on the Pacific coast, by E. H. Barry, p. 34-5; Electricity to solve difficulties in applying power to haulage cables, by C. O. Cole, p. 36-7; New and novel patented device for the felling of trees by electricity, by T. C. Burdick, p. 38.
- Wood craft, Aug. 1912.—Elizabethan interior woodwork; its characteristics and construction, by John Bovingdon, p. 135-9; Primitive working methods and tools in China, by F. A. Foster, p. 140-2; Pith flecks found in fine-textured woods, by Samuel J. Record, p. 143-4.
- Forest journals*
- Allegemeine forst- und jagd-zeitung, July 1912.—Tiefpflanzung als beförderungsmittel des anwachsens und gediehens der eichenheisterpflanzungen, besonders auf trockenem boden, by Tiemann, p. 231-6; Wahrnehmungen über die wäldverhältnisse in der gegend von Abbazia in Istrien und über das verhalten mehrerer holzarten gegen den salzgehalt der luft

- an den klippen des Quarneros, by Anderlin, p. 236-9.
- Bulletin de la Société centrale forestière de Belgique, July 1912.—Quelques expériences et observations en matière forestière; expériences sur l'origine de la graine, p. 402-10; Incendies de bois, p. 410-19; Sur une théorie nouvelle de la captation de l'azote atmosphérique par les plantes, by E. Henry, p. 419-31.
- Canadian forestry journal, July-Aug. 1912.—The British Columbia forest act, p. 88-91; Experiment needed in pulp making, by H. R. MacMillan, p. 92-97; Government forests in Saxony, by W. G. Wright, p. 105-8; The aspen tree in the northwest, by A. Knechtel, p. 109.
- Centralblatt für das gesamte forstwesen, June 1912.—Ueber die wahl der schirmschlag- und femelschlagformen nach der bestandeszusammensetzung, by Micklitz, p. 251-65; Neuere bestrebungen auf dem gebiete der holzkonservierung, by E. F. Petritsch, p. 265-82.
- Forest leaves, Aug. 1912.—Narrative of the Bushkill meeting of the Pennsylvania forestry association, p. 146-9; The possibility of reproducing our eastern forests by natural means, by Nelson C. Brown, p. 149-51; The effect of trees on health, by Alexander Armstrong, p. 151-3; Forest taxation in Pennsylvania; proposed legislation, p. 153-5.
- Indian forester, June 1912.—Turpentine in Florida on an American national forest, by Theodore S. Woolsey, p. 280-6.
- Quarterly journal of forestry, July 1912.—The crown woods of the Isle of Man, by E. W. Hasell, p. 179-83; State re-afforestation in New Zealand, by B. Hill, p. 184-7; The nun moth problem in Saxony, by C. F. C. Beeson, p. 189-94; Japanese v. European larch, by Charles P. Ackers, p. 195-200; Effects of the drought of 1911, by Fraser Story, p. 206-19; Competition of plantations and home nurseries in Yorkshire, by Chas. Hankins and W. Somerville, p. 220-45; The black Italian poplar as a timber tree, by R. M. Gibbon, p. 263-4.
- Schweizerische zeitschrift für forstwesen, June 1912.—Bestandespflege, nachhaltigkeit und reservfonds, by G. Z., p. 177-81; Die durchforstung im gebirgswald, by B. B., p. 181-5; Die entwicklung des aargauischen forstwesens, p. 189-93; Neue verpackungsmethode für pflanzen, by Neuhaus, p. 195-6; Die neue forstgesetzgebung Italiens, p. 196-8.

REDUCED FOREST FIRES.

The adoption by Massachusetts of observation towers at a cost of about \$20,000 is said to have cut down the forest fire loss from \$530,426 last year to \$50,000 this year, the figures in both cases applying to the first seven months of the year.

The towers are scattered all over the State. Each has a watchman with a telescope on duty daily looking for signs of a forest fire and ready to telephone the forest warden of the vicinity.

Of 1,500 fires recorded the present year 1,300 were first reported by the tower watchers. Nearly one-third of the total number are ascribed to locomotive sparks, and they burned over 3,586 acres, causing a loss of \$19,167 and a cost in putting them out amounting to \$2,598.

In the other two-thirds of the total 11,381 acres was burned over, causing a loss of \$30,824 and a cost for putting out of \$9,171.

TRANSPLANTING IN WASHINGTON.

During the fiscal year ended June last, 3,824 trees were transplanted from the District of Columbia nurseries to permanent places along the streets, according to the annual report of Trueman Lanham, superintendent of trees and parkings.

More trees were destroyed by leakage of illuminating gas than by any other cause, 320 shade trees having been killed in this way. Superintendent Lanham places the blame on local gas companies, who do not repair their mains promptly.

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WHY DO LUMBER MEN NOT APPLY FORESTRY?

By DR. B. E. FERNOW

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IT is precisely thirty years, a generation, since the forestry movement was publicly started in the United States by the Forestry Congress meeting in Cincinnati.

What success has it had in persuading timberland owners to apply forestry methods to their holdings? Outside the Federal Government, which has actually and on a large scale begun to introduce forest management on its timberlands, outside of a few half-hearted and small beginnings of some of the States to bring their few acres of timberland under some systematic treatment, how many private owners and on how many acres have they made even such beginnings in changing their attitude towards their timber properties and cut-over lands, such as forestry implies?

When it is realized that the private ownership represents about three-quarters of the total timber supply and forest area of the country, the importance of the attitude of the owners becomes apparent.

Whatever some hopeful enthusiasts may think of the situation, to the cold-blooded reasoner from facts, there is as yet little cause for congratulation visible. There is, to be sure, little information published on the subject, but we may be quite sure that everything worth noting is on record regarding private endeavor in introducing forest management, and in what is on record the most comprehensive construction has been given as to what includes forest management.

The results of an inquiry reported in

the second volume of the Report of the Commission of Conservation show that out of around 600 firms, representing not as much as 3% of the total privately owned acreage, hardly one-fifth in numbers uses some conservative methods, one-quarter is held for a future crop, and only a little over one-third in acreage reports even measures taken for protection against fires! In another inquiry, the acreage reported protected against fire rises to as much as 50 per cent of the reported ownership. If these reported conditions were at all representative, they would show, that still most owners of timberland do not even take precaution to protect their property against fire. In this respect, however, great strides for the better have been made lately, and, if a new inquiry should develop that really effective measures are in operation on half the acreage of *cut-over lands*—the most important part for the future—our hopes for the eventual application of forestry would rise one hundred per cent.

This leads us to the question: is protection against fire forestry? Is the surveying and mapping, and more careful estimating and locating of timber, and systematic arrangement of logging operations, forestry? Is even, holding for a future crop forestry? Indeed, what is forestry?

It seems rather late in the day to raise this question, and yet even professional foresters have hazy notions as to how to answer the question; the incidents of forest management appear to them principal issues! Of course,

protection against fire is necessary in order to carry on forest management. So in any other business protection of the property is a first essential; it is merely a general, not a specific, measure, belonging to any one business.

Of course, it is wisdom to base logging operations on systematic plans based on accurate information, as in any other business. This also is merely a general prerequisite of scientific, i. e., rational management not specific to forestry except in the method of ascertainment. It is, to be sure, also an incident to forest management, but not an essential. Lumbermen have done similar things without any thought or knowledge of forestry, in a cruder manner, and may now find that the foresters do it better and cheaper than the old cruisers, hence may be inclined to employ foresters.

Lumbermen that will make plans to protect their property will map and plan the operations on their holdings systematically, they will adopt measures to reduce waste in the logging, to utilize more closely, etc., merely because they find that it pays *in the present*. The cutting to a diameter limit, which is advocated as a forestry measure, is also commendable to the lumberman only when he has figured out that his present business of exploiting the forest pays better if he delays for some years the cutting of smaller sizes until they have increased in diameter and value; it is a short time financial calculation that induces him which has not necessarily anything to do with forestry. Even the "holding for future crop" will, we suspect, be found in most cases to reduce itself to the same position, namely, a waiting for increase in size and value of the present immature crop which Nature had provided.

Finally, we must declare, that leaving mature timber standing is no more forestry than storing and keeping locked up goods in trade!

Some of my professional friends will take issue with these declarations, since all these measures are incidents or may be turned into useful adjuncts to forestry management. But I take the position that from the broad standpoint of

political economy the idea of forestry involves an attitude of the owner towards his property, which either makes these measures a part of a forestry program or excludes them from such designation.

The forest can be looked upon either as a mine, the stored material of preceding ages, which the lumberman exploits, or else it may be conceived as a crop, which the forester harvests and reproduces. Reproduction is the keynote of forestry; it denotes the difference between the exploiter, the converter of material into serviceable form, and the forester, the crop *producer*.

How many of the timberland owners, even those who adopt the measures enumerated above for improving their business conduct, look at their property as a means for continuous crop production, for sustained yield? I do not mean the strict economic sustained yield, but the silviculturally sustained yield, i. e., the deliberate, intentional devotion of the soil to the production of wood crops. I venture to assert that there are as yet not as many as can be counted on the fingers of two hands who would affirm that they had deliberately started into the business of wood production—which is forestry!

Even those, who have started planting their waste places—and we are glad to see their number growing rapidly—will be found often dubious as to their purpose.

At any rate, we come back to the original statement that attempts on the part of corporations and individuals to start in the forestry business are so sporadic and few that it is worth while to inquire for the cause of the failure to follow our advice.

There is one simple answer, the one condition by which forest cropping differs from all other business: the *time element* and the many uncertainties which that involves!

It takes 60 to 100 years and more to grow saw timber from the seed—as a rule, varying with locality and species, 1 inch in 5 to 10 years in diameter may be secured on the average; the sower rarely is the reaper. During all this time there is the fire risk, and the risk

from wind and insects; there is the capital invested without a chance of changing the investment. Will, so long hence, wood, or this particular kind of wood be wanted in the market? Will substitutes have replaced wood? What will be the wood prices? Will our present outlay be returned to us with proper interest earnings?

We may point to Europe and show that forest property after all is on the whole not necessarily so hazardous as with us at present—with us it is still more hazardous than any other and for reasons must remain so for some time; that, in spite of substitutes, wood consumption has continuously increased; that wood prices have continuously increased; that excellent returns have come from persistent forest management.

All this occurred under other conditions of civilization, and in the past, who can assure us of the future? Forestry deals in futures, and if it is hazardous to deal in futures in Wall Street, so the forester owner thinks it is wiser to secure the present dollar instead of waiting for the possible two. The disposition of all our people is to live for the present, and the timberland owner is naturally not an exception.

This sounds altogether pessimistic. It is not intended to be so, but is to bring home the fact that forestry as defined above is a business *sui generis*, that it can be successfully carried on only under special conditions, and that private, present interest is not likely to enter it with ardor and persistency. One of the important conditions for its successful conduct—we leave out of consideration the farmer's wood lot—is *size*.

Some twenty years ago I was asked whether I thought that forestry could be profitably practised in the United States at that time. I did not hesitate to state the conditions under which, in my opinion, it could be practised. Give me two million acres of southern pine and three million dollars of capital, and it would not be difficult to demonstrate that a real forestry practice, i. e., deliberate, systematic reproduction of the cut areas will pay in the long run.

Altogether, forestry is a business for the long run, hence persistent corporations, municipalities, States who live into the future are the proper persons to engage in it. Until we wake up to this realization much energy to induce small forest owners to go into the business will be wasted.

HIS WISDOM.

He didn't know how to handle a rod, nor how to attach a fly;
He didn't know how to catch a trout in the brook that went flowing by;
When he wounded a buck he didn't know whether to run or stay and fight,
And he didn't know how to make a temporary camp at night.

He didn't know how to tell the time by looking at the sun;
He didn't know how to take the shells out of a loaded gun;
He got so turned around he didn't know what course to take,
And he didn't know what to do when he was bitten by a snake.

He didn't know what it was once when he handled poison oak;
He didn't know how to build a fire, nor how to conceal its smoke;
But he was wise—of that fact there can't be the slightest doubt.
When he broke camp he knew enough to put the fire out!

Pasadena, Cal.

HOWARD C. KEGLEY.

NEW YORK'S LUMBER INDUSTRY.

New York is credited with having 2,263 lumber and timber plants, employing an average of 27,471 people. The value of the product for the year was placed at \$72,530,000. There were 674 independent planing mills, 1,389 lumber mills and 200 packing box factories.



REDWOOD LOGGING. FELLERS MAKING THE UNDERCUT. AFTER THIS HAS BEEN DONE AND THE BARK CUT AWAY A SAW IS USED.

LOGGING ENGINEERING

BY GEO. M. CORNWALL,

Editor The Timberman, Portland, Oregon

THE need creates the man. The development of the lumber business of the States of California, Oregon, Washington, Idaho, Montana and the Province of British Columbia, has necessitated a type of rugged woodsmen for the removal of the timber from the hills and valleys to the mill pond at a minimum expense. Nature grew lavishly a timber crop in the great West. Here are approximately the figures which denote Nature's generous gift:

British Columbia	300,000,000,000	to
	400,000,000,000	ft.
Washington -----	391,000,000,000	ft.
Montana -----	65,000,000,000	ft.
Oregon -----	545,000,000,000	ft.
Idaho -----	129,100,000,000	ft.
California -----	381,000,000,000	ft.
<hr/>		
Total -----	1,811,100,000,000	ft.

These figures indicate that the lumber business of the Pacific Coast States will endure for a long time, the present output being in the neighborhood of about eight and one-half billion feet annually.

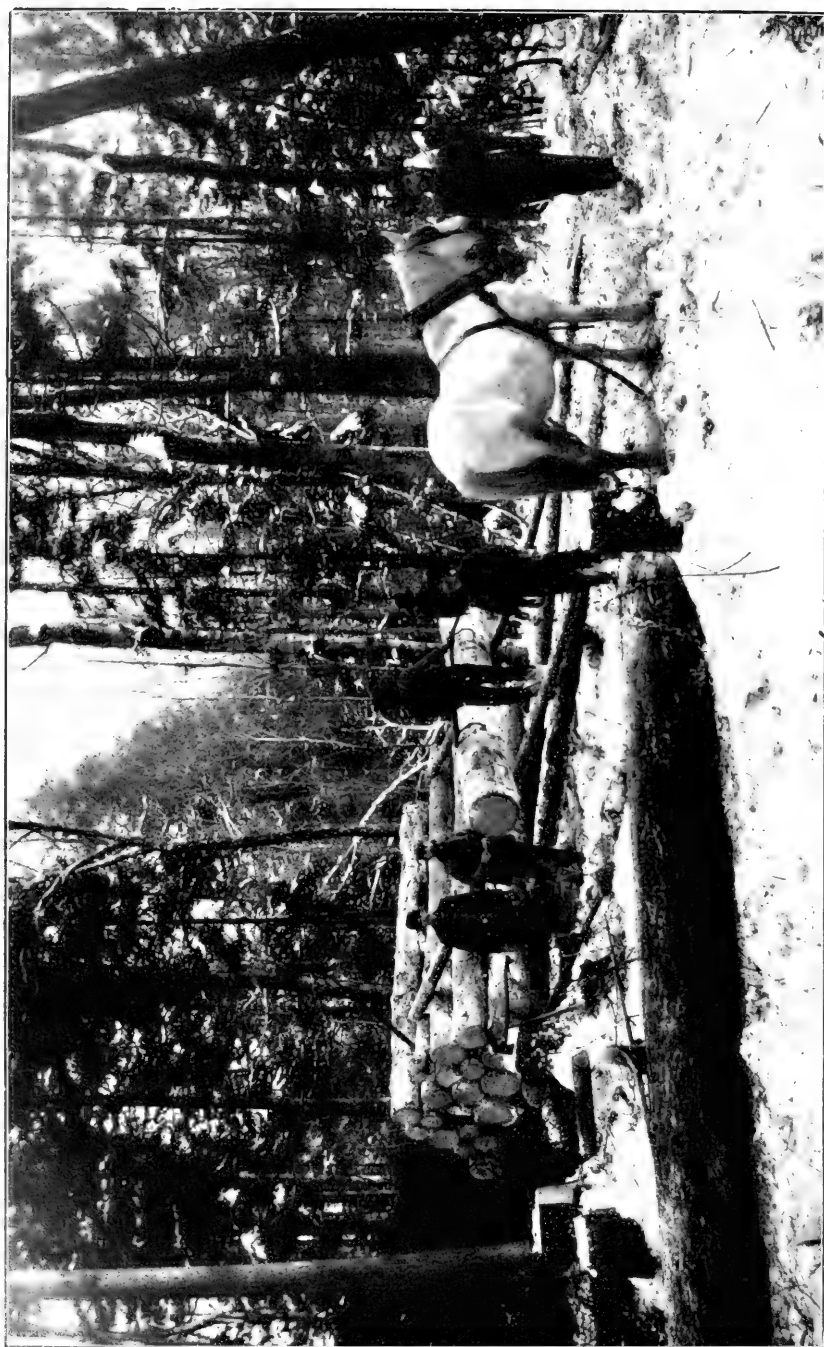
The timber of the West is found for the most part in comparatively inaccessible rugged mountain ranges, thus involving difficult engineering problems. In the early stages of the industry when the timber lined the banks of the numerous water courses, logging was rendered a comparatively simple and cheap operation. But this condition has passed forever.

The enormous size of the timber lying directly along the Pacific Coast, including the towering redwoods running up to 300 feet without a limb, and a diameter of 18 feet and over; the Douglas fir (Oregon pine), Menzies' tideland spruce, cedar and hemlock of the Coast

regions of California, Oregon and Washington; and the pine family to be found east of the Cascades and Sierra Nevadas, in Northern California, Central and Eastern Oregon, Eastern Washington, Idaho and Montana, and the interior of British Columbia, present topographical features that require a bold, daring, aggressive brain to successfully convert Nature's forest cover to the uses of mankind.

The primitive picturesque ox team has given way to the steam road. There are approximately 450 logging roads in the West, with an aggregate mileage of about 3500 miles. The number is constantly increasing. These roads cost with equipment, from \$10,000 to \$15,000 per mile, thus indicating the enormous investment in logging railroad equipment, and the necessities for the future. The cost of building these roads has a most direct bearing on the profit of the operation. Here is where the practical logging engineer is invaluable. His experience enables him to gauge with certainty the factor of safety required, yet keeping the initial cost down to a minimum. The railroad engineer generally fails when assigned to this task, as experience has abundantly borne out. He was trained in a different school. His factor of safety would spell financial ruin to many an operation. He forgets to take into account the temporary character of the time he is building; for, outside of the main lines, the roads are temporary, being moved from time to time as occasion requires.

These natural conditions have resulted in the creation of a type of logging engineering unknown anywhere else in the world. There are no parallels. The systems have evolved through sheer necessity. Brawn has



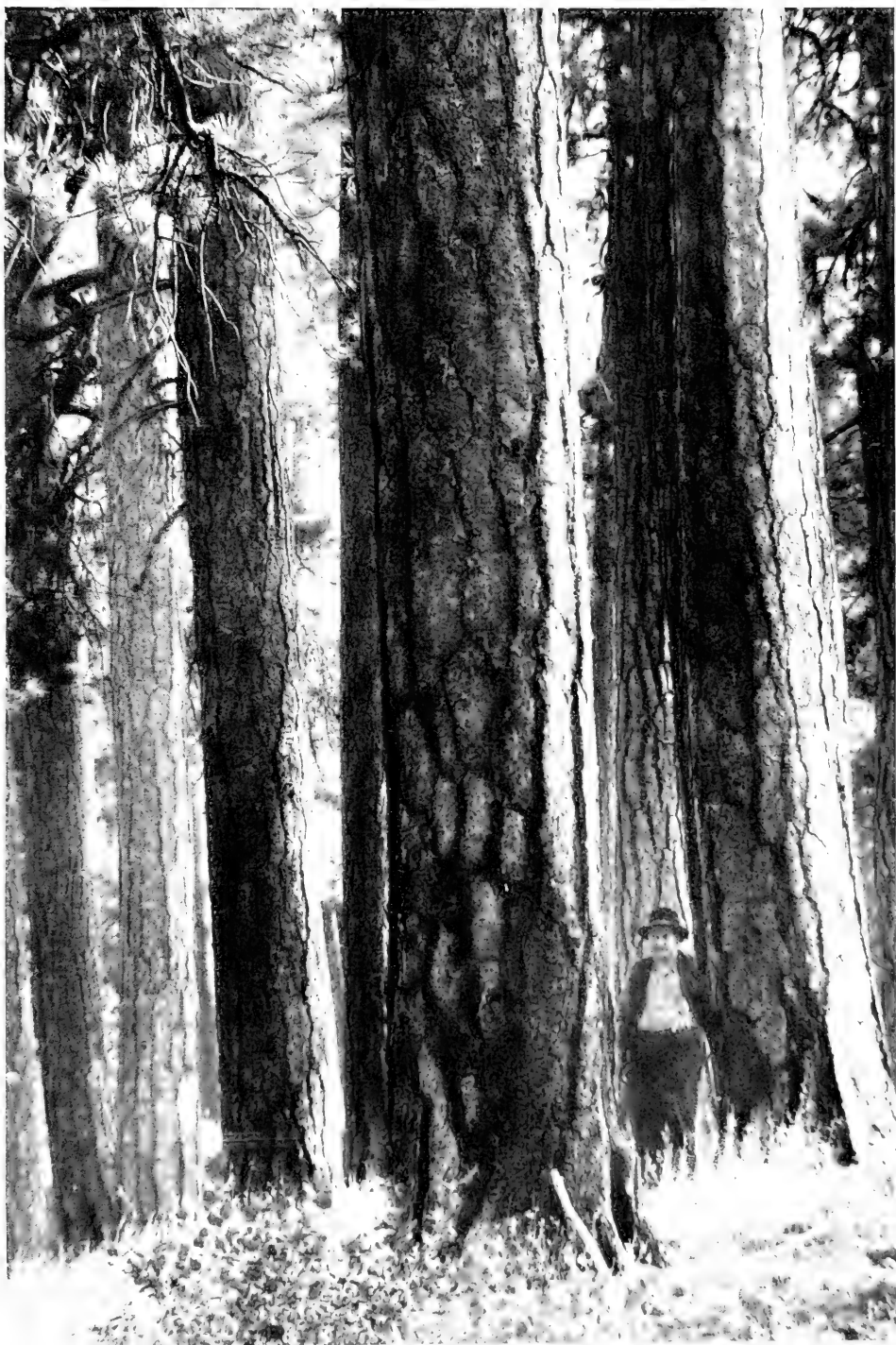
ONE METHOD OF SKIDDING LOGS IN WINTER WHICH HAS BEEN IMPROVED BY THE USE OF MACHINERY.



OXEN USED IN SKIDDING RED FIR IN A WASHINGTON FOREST BY THE OLD-FASHIONED METHOD.



HANDLING LOGS WITH AN OVERHEAD CABLEWAY.



SUGAR AND WHITE PINE TIMBER.

been forced to yield to brain. Not only has the Pacific Coast developed a logging system indigenous to itself, with the application of steam, but it has gone a step further and has begun to employ the white coal of commerce—electricity—in its operations. An elimination of the fire hazard; a reduction in fuel costs, and a surcease from engine water troubles are some of the advantages to be gained through the substitution of electricity for steam.

With the modernizing of equipment comes the vital need for a more technical knowledge on the part of the men. It was considered quite a step from an ox team to a logging locomotive (yet a knowledge of steam was not uncommon); it was a greater step to the utilization of an electric motor in log haulage.

Compressed air and hydraulic engines to lower logs down the steep mountain sides, for distances up to 3500 feet and over, have come into use. Here again the broader knowledge of mechanical engineering in its varied phases, at once becomes a necessity. As an in-

stance in the use of a steam lowering rig whereby logs are lowered 8600 feet on a grade approximately 77 per cent, at the plant of the Yosemite Lumber Company, Merced, California, gives a vivid and concrete idea of some of the difficulties which must be overcome in successfully handling coast logging operations.

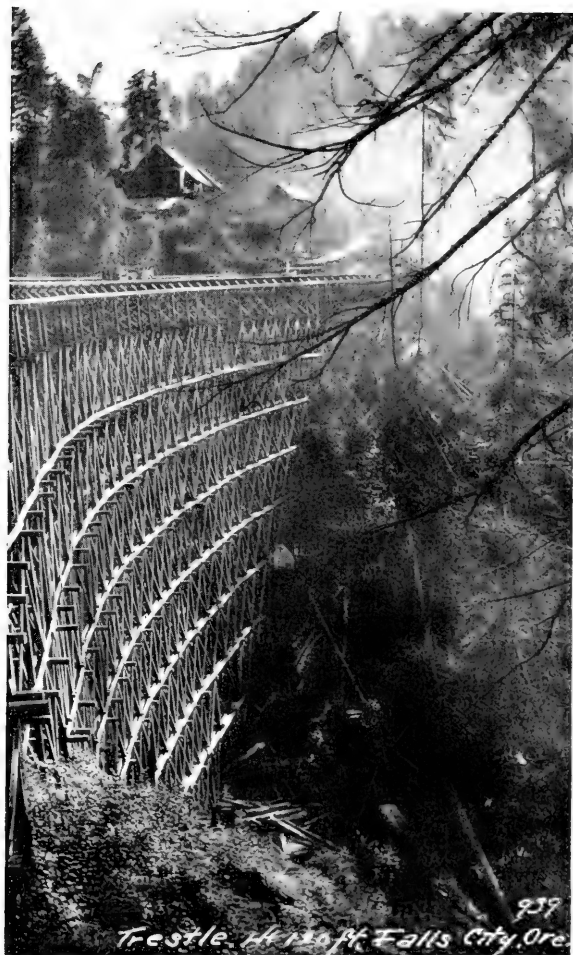
A knowledge of civil engineering that makes possible an accurate topographical survey by which the proper location of the roads is determined before commencing operations, involves more than a rudimentary knowledge of surveying. We have now reached a stage where relief maps in plaster of Paris, showing the topography of the country, are now employed in definitely determining the laying out of the operation.

This knowledge of mechanical and civil engineering must necessarily be combined in one individual before he can successfully lay claim to the title of a logging engineer.

With the broadening of knowledge incidental to the modern complicated logging operation has been brought



LOG SUSPENDED EN ROUTE TO THE LANDING.



LUMBER FLUME SUPPORTED BY A TRESTLE 120 FEET HIGH, FALLS CITY, ORE.

forcibly to the front the necessity for a greater and more intelligent care for the men who bear the burden and heat of the day. It is claimed that statistics show that we are only securing about 70 per cent results in our mills and factories, due almost entirely to a lack of physical efficiency. Here is a demand for a knowledge of the underlying principles producing efficiency. If better food, better housing, and adequate bathing facilities are the prerequisites—and they are—why should not a portion of the time spent in executive effort to increase the efficiency of the machinery

be spent to increase the efficiency of the men?

Now, how shall we make it possible to provide this necessarily composite knowledge for the logging engineer? Taking the agricultural college as a basis, we find that the course of study was literally made by the farmers; the result has been practical education. The graduates make better farmers than their fathers.

Adopting the same line of reasoning, the lumbermen should draft the courses of study in our colleges and universities where logging engineering is taught.



FALLING MENZIES TIDE LAND SPRUCE.

The course would embrace three branches: First, a knowledge of practical logging, by a preceptor who could hang an ax and fall a tree accurately, yet might not be able to conjugate the verb "amo" to save his life, nor be very proficient in the modern languages.

A practical cruiser or estimator of timber is essential. A knowledge of the amount and character of timber is the basis of operations. The third instructor should be a skilled civil and mechanical engineer, with technical and practical knowledge in equal ratio.

The course of study should involve at least six months in each year in the woods, carrying forward practical log-

ging operations under the guidance of the preceptors. In the winter time, courses in civil and mechanical engineering would be pursued. Each man should attain proficiency in ordinary machine shop practice, coupled with a knowledge of blacksmithing.

On the Pacific Coast at the University of Washington, a practical forestry course has been pursued for several years. The Oregon Agricultural College, and the universities of Idaho and Montana have also provided such courses. In California and British Columbia plans are being formulated for the establishment of logging engineering courses.

FIVE YOKES ON TEAM, OVER 12,000 POUNDS OF BEEF, USED IN HAULING LOGS.



There is a broad and growing field for the logging engineer in the West. Every other large industry can point to its leaders: In electricity, Edison; in

canal building, Goethals; in railroad building, Hill. Why not in the great lumber business which ranks among the first of the world's mighty industries?

OUR TIMBER EXPORTS

OFFICIAL statistics of exports of forest products from United States ports during the year ending June 30, 1912, show an increase in value of over \$4,000,000. The total value for the year under review amounts to \$96,782,186, as compared with \$92,225,951 for the preceding year. The increase is due to expansion of trade in boards, deals, planks, joists, and scantling which account for more than half the total export; the figures are 2,340,909,000 ft. for 1912, against 2,060,965,000 ft. for the preceding year. The advantage thus gained not only makes up for the decrease in the export figures for timber but shows a substantial increase on the combined figures. Timber, hewn and sawn, has

fallen from 531,634,000 ft. exported in 1910-11 to 438,021,000 ft. for last year. The loss is not attributable to any marked individual reduction, but is spread over all the consuming markets. In lumber the figures for Canada show the large increase of 49,736,000 ft. over the 403,285,000 ft. of the preceding year; South America took the enormous addition of 139,683,000 ft. over 1911; British Oceania 31,937,000 ft.; Netherlands 20,728,000 ft.; United Kingdom 10,104,000 ft. (from 216,433,000 ft. to 226,537,000 ft.). On the other hand shipments to China show a falling off of 37,945,000 ft.; Africa a loss of 10,001,000 ft.; Cuba 8,925,000 ft.; Italy 5,818,000 ft.; Belgium 4,466,000 ft.; France 3,758,000 ft.; Germany 2,983,000 ft.

BOY SCOUTS TO PLANT TREES

JH. MCGILLIVRAY, Deputy Forest Warden of Michigan, under the direction of Major William R. Oates, who organized the Michigan Forest Scouts, including the Boy Scouts of America, has worked out another plan for showing the boy scouts how to be of help to the nation. McGillivray is planning to have 5,000 boys plant pine seedlings next year. The planting will be done on the land from which trees have just been cut down. The seedlings are secured from the Agricultural College plantation, and the railroads deliver them to the boy scouts

free of charge. "When a scout or a company of scouts," writes McGillivray, "makes a showing in planting the seedlings we put an honor medal on each scout for service.

"Permit me to suggest that it would be a splendid thing if you could work your scouts with the State Forestry Warden of the forest districts in fire protection and reforestation. Here in Michigan, for the present at least, we must maintain the integrity of our State organization, but there is no reason why you could not line up all the other States in this service."

WOOD PRESERVATION AS A FACTOR IN FOREST CONSERVATION

By E. A. STERLING

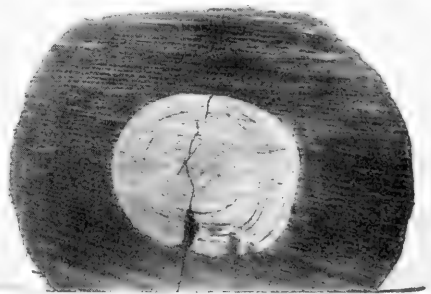
President, American Wood Preservers' Association

THE preservative treatment of timber against decay has developed rapidly into a very important industry, the broad significance of which is not fully appreciated. The industry has assumed large proportions primarily because of its commercial value; but, in addition, it has a very broad bearing on questions of forest conservation. It helps all wood consumers directly by insuring longer life of material and less frequent renewals; while indirectly it is of value to every citizen because it is a factor in keeping down lumber prices and in conserving our forest resources. To the timberland owners, from lumber magnate to farmer, it means a new and better market for wood material.

The forest propaganda movement of the past twenty years has emphasized the need for fire protection, more equitable forest taxation, closer utilization, and the production of successive forest crops on land unsuited for agriculture. In other words, it is urged that we perpetuate our forest resources by protection and wiser use, so that they will serve our needs. The rapidly increasing consumption of timber—the amount used per capita being about seven times that in Europe—makes the task of providing definitely for our growing requirements almost a hopeless one. Without a material decrease in consumption, the spectre of a future timber famine, which has been marched out at opportune times to arouse latent public sentiment and hasten forest legislation, may actually materialize to the extent of high prices and a distinct scarcity of certain grades or species of timber. High grade white pine, for example, already commands famine prices, and white oak is rapidly approaching the same condition. An actual timber

famine is not likely to come in the lifetime of men now living; yet it is quite probable that a crisis will be reached which will affect national prosperity to such an extent as to force a solution of our timber supply problem.

Wood preservation at present is the strongest factor in the reduction of our annual timber bill, which, for lumber and wood in all forms, reaches an enormous total equivalent to at least one hundred billion board feet, worth over

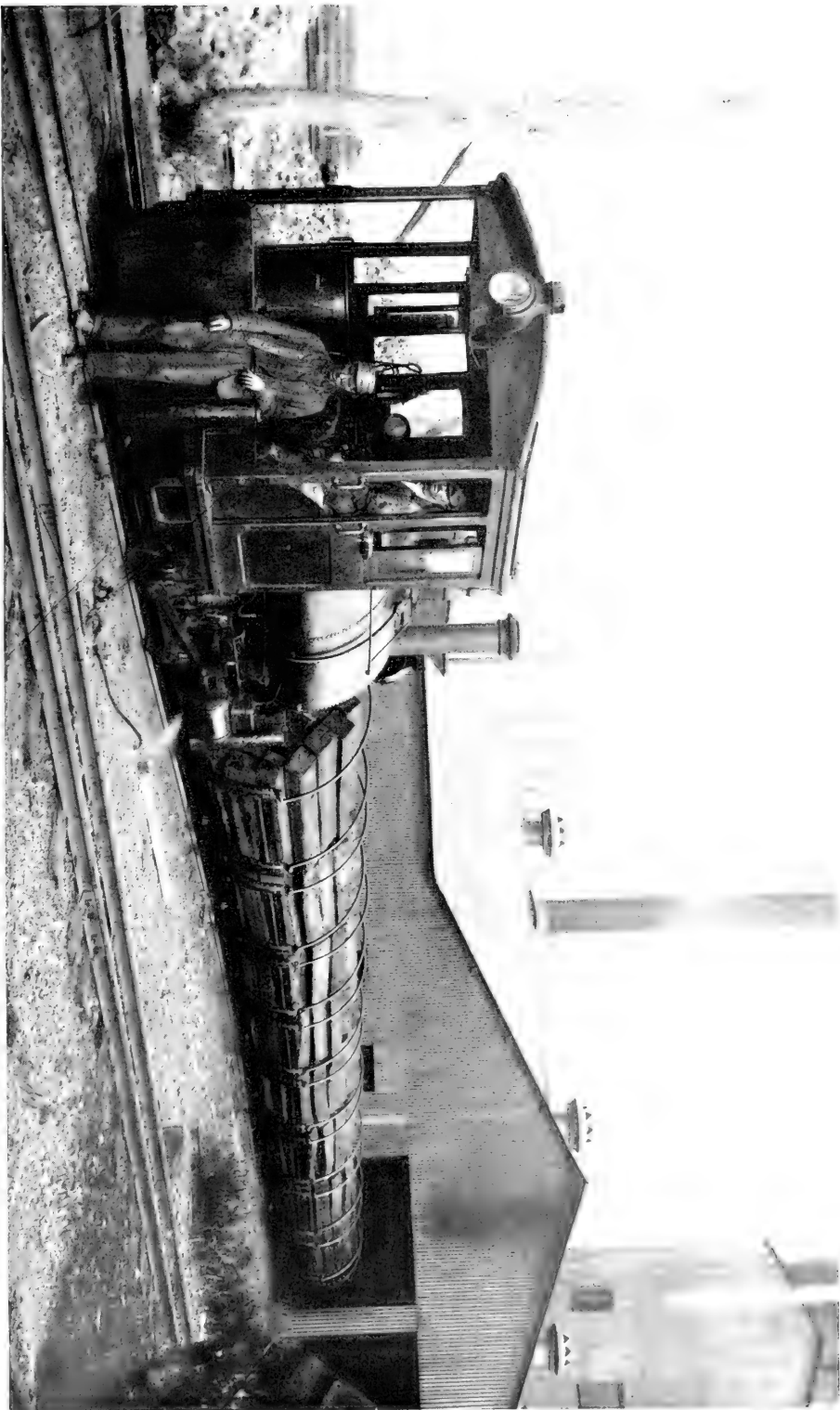


CREOSOTED BEECH CROSS-TIE SHOWING IMPERVIOUS "RED HEART."

one and one-quarter billion dollars at point of manufacture. Nearly half of this is manufactured lumber produced in mills sawing more than 50,000 feet annually. Preservative treatment not only reduces this drain on the forests by increasing the life of timber and making one stick do the work of two or three, but it permits the use of many inferior woods which would be useless without treatment. For the eastern railroads it has kept the source of cross-tie supply nearer home through the use of non-durable woods, such as beech, maple, sap pine, etc., instead of the more expensive white oak and long-leaf pine, which have to be shipped long distances.



GENERAL VIEW OF THE PENNSYLVANIA R. R. WOOD PRESERVING PLANT AT PHILADELPHIA, PA.



A CHARGE OF TIES READY TO BE PUT IN THE TREATING CYLINDER. SEVEN OF THE CARS MAKING UP THE CHARGE ARE OUT OF SIGHT IN THE CYLINDER

In Forest Service Bulletin No. 78 it is stated that "Nearly ten billion feet board measure of structural timber are destroyed each year in the United States. * * * If all the timber were treated which it is practicable to treat, and which could be treated at a profit, nearly six billion feet board measure, or over sixty per cent, could be saved. This saving would represent the annual growth on twenty million acres of well-stocked timber land." In cross-ties alone, the Government estimates that proper preservative treatment would reduce the annual cut to the extent of nearly 60,000,000 ties per year, which is the equivalent of two billion board feet.

The first wood-preserving plant in this country of which there is record was built at Lowell, Mass., in 1848; while the first railroad plant was erected by the Louisville & Nashville Railroad at West Pascagoula, Miss., in 1876. Between these dates and the late 80's there was little development. In 1900 there were only eleven plants in operation, but by the end of 1911 the number had grown to one hundred and one. Of these twenty-four are owned and operated by railroad companies, while the remainder do a general commercial business in the treatment of a large variety of timbers.

The capital invested in these plants is certainly not less than \$10,000,000, while the value of the wood material carried in stock for seasoning would run into many more millions of dollars. The initial cost of the plants, however, is comparatively low, considering the enormous volume of material handled and its cost value when treated. A \$100,000 plant, for example, will treat each year material worth from one-half to three-quarter million dollars. On the basis of the output of treated timber in 1910, which are the latest figures available, the value of the cross-ties, lumber, poles, and other timbers which received treatment approximated \$35,000,000.

Great as has been the progress in preservative treatment, a large percentage of the timber is still used in its natural state. The industry has been

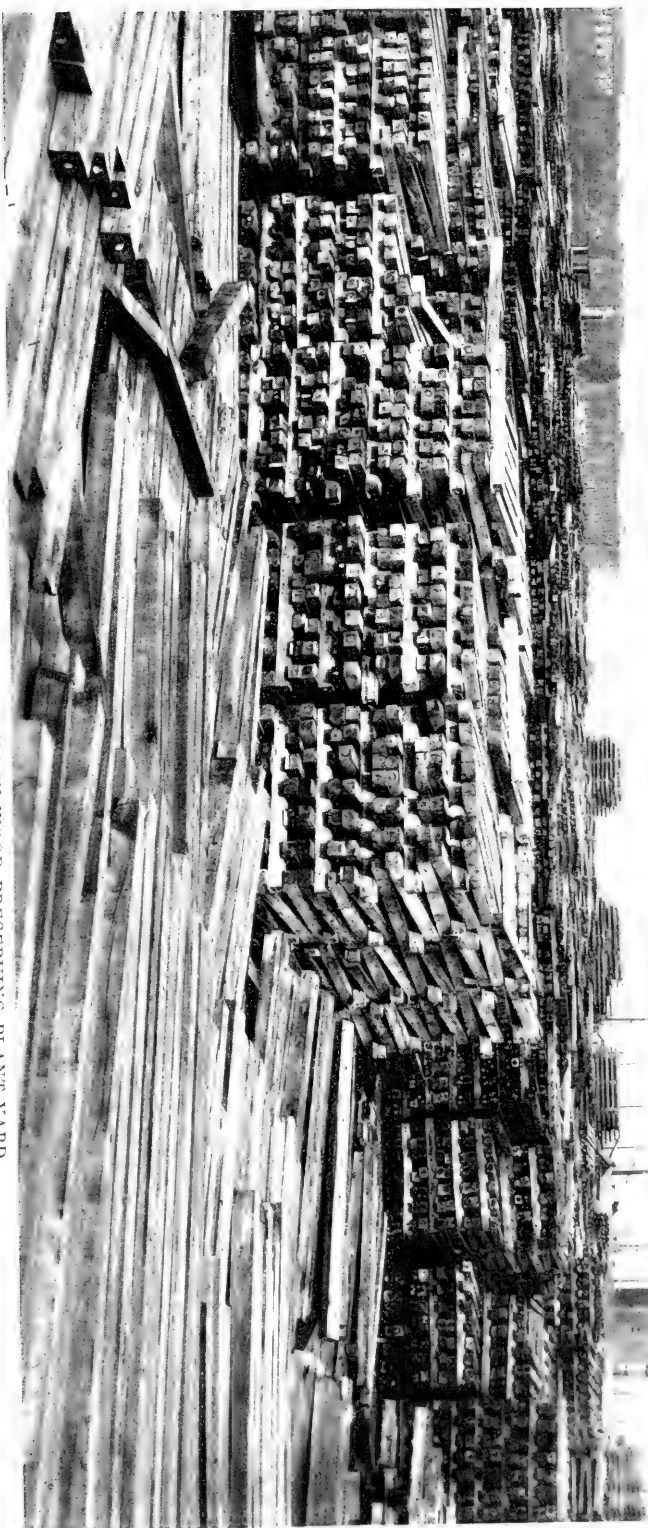
built up largely on railroad cross-ties; yet, out of the 148,000,000 used in 1910, only 30,000,000, or about 21 per cent, received preservative treatment. This, however, is an increase of 275 per cent over the number treated in 1905. During the same year 133,000,000 board feet of lumber and timber were treated, which represents less than one-third of one per cent of the total consumption. The total output of all kinds of treated material in 1911 amounted to slightly over 110,372,000 cubic feet, which is over 500 per cent more than was treated in 1904.

It is very difficult to appreciate exactly what cross-ties and lumber, when stated in units of millions, mean in terms of volume. Some idea may be gained if we consider that the 30,000,000 ties treated in 1910 would, if piled 20 ties high, according to the usual arrangement in a treating plant yard, cover an area of over 600 acres, or practically a square mile. If laid one deep side by side, these same ties would cover 10,000 acres with a solid wooden floor the full thickness of the ties.

It certainly must pay to inject timber with preservatives, or the railroads and other commercial concerns would not undertake it. The theory, which is very old, has become an established practice of unquestioned merit. Owing to the comparatively short time treated timber has been used in this country, and the long time required to get results from service tests, many of our conclusions are based on European results. We have, however, records in this country of creosoted piling resisting teredo and decay for twenty-five and thirty years in waters which would destroy untreated timber in a few years; while many treated cross-ties have been in track ten to fifteen years without signs of deterioration. In France, an average life of about twenty-eight years is obtained from creosoted beech ties, which would not last over four years, untreated.

Experimental preservation of woods was attempted in England more than one hundred years ago, and commercial treatment of timber has been practiced in Europe for over fifty years. Out of

CROSS TIES PILED FOR SEASONING IN WOOD PRESERVING PLANT YARD.



the large list of preservatives which have been tried, long experience has reduced the number which are of accepted value to two; namely, coal tar creosote and zinc chloride. In 1910 the consumption of creosote in the United States totalled 63,266,000 gallons, of which 38,640,000 gallons, or 69 per cent, were imported; while zinc chloride was used to the extent of 16,802,500 pounds. The latter, which is a soluble mineral salt, leaches out of the wood in wet climates, and is of greatest value in arid regions. Creosote is the preservative most generally used, present developments indicating the decreasing use of zinc chloride alone; although in mixture with creosote, or with some heavy oil as a seal, it promises excellent results.

The methods or processes by which preservatives are introduced into wood involve many technical details which are not of general interest. Preservatives are applied by pressure, open tank, and brush application. Of these the first is of greatest value and most widely used, open tank and brush treatments being superficial and of value mainly

where low cost is essential and facilities for thorough treatment are not available.

The usual type of wood-preserving plant is equipped with from one to five heavy boiler plate cylinders, from six to seven feet in diameter and about 130 feet long. The additional equipment necessary to operate the plant includes steam boilers, pressure and vacuum pumps, air compressor, storage tanks, etc. The cylinder has a heavy door which can be tightly closed by heavy pivoted bolts, tight-fitting gaskets preventing the escape of the preservative under pressure. The ties or timber for treatment are loaded on narrow-gauge steel cylinder cars, and a whole train—usually fifteen cars—is run bodily into the cylinder; tracks being provided inside the cylinder and the cars designed so that they just fit the available space. The heavy door is then closed and the hot creosote introduced from overhead tanks. Pressure is then applied and increased up to 160 to 200 pounds per square inch, or until the desired amount of absorption is obtained. The oil is then dropped into



CROSS SECTIONS OF BEECH TIE TREATED BY THE REUPING PROCESS AT STENDAL, GERMANY.



PINE TIES TAKEN FROM TRACKS OF PRUSSIAN STATE RAILWAY AFTER TWENTY-THREE YEARS' SERVICE. TREATED WITH ZINC CHLORIDE AND CREOSOTE.

an underground receiving tank, or forced back by compressed air, and the charge withdrawn. This covers the essential steps of the so-called full cell or Bethell process. Various modifications are made for special purposes, such as preliminary steaming, followed by a vacuum, to remove the saps; initial vacuum, before introducing the oil; and a final vacuum to recover surplus oil. An economical process, known as the Reuping, requires an initial air pressure, followed by the introduction of the oil without relieving the pressure. At the end the compressed air in the

wood forces out 40 to 60 per cent of the oil originally injected, leaving only the cell walls impregnated; hence the name "empty cell" process. Another process designed for a reduction in initial cost is a mixture of creosote and zinc chloride in solution, the two liquids being agitated and kept in emulsion by a rotary pump, through which the entire mixture, in the cylinder, passes every seven to ten minutes, even while under pressure.

The tendency in this country, where timber is still comparatively cheap, is to economize in the treatment by using

partial doses of oil, or mixtures which are cheaper than pure creosote. In Europe much heavier treatments are given, the practice on most of the French and English railroads, for example, being to impregnate sleepers practically to refusal. The Prussian State Railways, on the other hand, have recently adopted an empty cell treatment. The amount of preservative should be determined largely by the traffic and maintenance of way practice. On most American roads where cut spikes are used and the tie-plates are small or eliminated entirely, it would be folly to inject enough preservative to protect the tie from decay for thirty years and have it wear out in a third of this time. In Europe, where screw spikes and heavy plates or chairs are standard equipment, mechanical wear is reduced to a minimum and a more expensive treatment is justified. It will be a mark of distinct progress when American roads protect their ties from wear as well as from decay.

All woods do not have the same capacity for absorbing preservatives, owing to differences in the wood structure. Red oak will treat readily, while white oak and chestnut absorb only a superficial coating, even under high pressure. The sapwood of most species

treats easily, but the heartwood of most timbers is resistant. The best results can be obtained only by thorough knowledge of the characteristics of various woods and manipulations of the treatment accordingly.

Wood preservation has become a commercial necessity, and because it saves the wood consumer dollars and cents, will remain an important industry. The railroads and other large wood-consuming corporations incur heavy initial expenses for plants and increase their current costs on wood material in order to profit by reduced annual charges through the longer life of the material. The small wood consumers cannot take advantage of the pressure treatment unless near a commercial plant; but the brush and open tank treatments are available to farmers, fruit growers, and others who need to preserve their posts, stakes, lumber, etc. Whatever is done by corporations or individuals, the broader aspects of wood preservation should not be overlooked, since any reduction in the drain on the forests will tend to conserve the timber supply and keep prices down. Low lumber prices, in turn, mean conservation in the pocket-book of every individual citizen.

PENNSYLVANIA'S TRADE.

Lumber and timber industries in Pennsylvania employed on an average of 32,073. In the census of 1859 the lumber industry of Pennsylvania ranked first among the States. In 1909 the production of lumber was 1,462,771,000, which was a decrease of 36.3 per cent. from 1899. About 56 per cent. of the lumber manufactured was soft wood; oak 20 per cent.

KENTUCKY'S STATE FORESTER.

At a recent meeting of the Kentucky State Board of Forestry, Mr. J. E. Barton, formerly connected with the U. S. Forestry Service, was elected State Forester for Kentucky.

FIRE PREVENTION.

The Pacific Logging Congress believes in the expenditure by the various States and Provinces of liberal and adequate appropriation for forest fire protection. To this end the Congress has indorsed the efforts being made for the creation of field military posts, near the national forests, with a view of utilizing the national troops where emergencies arise in the protection of the national forests from fire.

METHOD OF FORESTRY CAMPAIGNING

BY E. T. ALLEN

Forester Western Forestry and Conservation Association

I PROPOSE to discuss not needs or methods of better forest management, but means of making propaganda for these things effective, or, in other words, the technique of the publicity and educational work that is almost as important as forestry itself. The Western Forestry and Conservation Association has probably devoted more effort to developing this line of action than any other agency. Its success in moulding public and legislative sentiment is the reason I have been asked to describe some of its methods in the hope that they may suggest something of help elsewhere.

It may be well to begin by describing our organization itself, both because it might be duplicated in some localities and to show wherein its methods may not be practicable for ordinary forestry associations dependent upon small dues from a large but somewhat passive membership. It has no individual members, but is a league of over a dozen local organizations extending from Montana to California. Two are State conservation associations with miscellaneous membership, but the rest are all working patrol associations maintained by timber owners. These constituent locals are actual protective agencies, spending from \$250,000 in a favorable year to \$700,000 in a year like 1910 for patrol, fire-fighting and building trails and telephones. They patrol nearly 20 million acres and with remarkable success, for being unhampered by politics or the economical vagaries of appropriating legislatures or congresses, they have developed probably the most efficient and perfectly-equipped systems in the United States. They are financed by pro rated assessments upon the members' acreage, varying from 2 to 10 cents an acre, according to season and locality.

Attending to local field work inde-

pendently, these fire associations levy an additional acreage assessment for the Western Forestry and Conservation Association in order to have a clearing house for ideas and experience in fire matters, facilities for cheaper and more effective educational work than they could do alone, and a medium for developing co-operation with State and Government. The leading State and Federal forest officials are members, ranking in its meetings and on its committees with the delegates sent by the constituent private organizations. The result is a triple alliance; working in the utmost harmony for the common end of forest preservation, accorded thorough public confidence, and financed chiefly by forest owners for utilizing opportunities afforded by all three. It has a voice in all official councils and measures, as well as in the press and with lumbermen and public, because it is non-partisan and particularly because it represents those who spend money and do things rather than those who merely ask others to do and spend. An illustration of our standing was afforded in 1910 when, upon the request of our president, Mr. Flewelling of Spokane, President Taft ordered out the army to fight fire.

In gaining this power and in using it our first principle has been never to seek any end not of general benefit or to show discrimination for or against State, Government, lumbermen or public. We are equally without sympathy for the propagandist who locates all forest evils in the greed of lumbermen and seeks remedy by recent—breeding impracticable compulsion, or for the unreasonably individualistic lumberman who does about equal harm by his own bad methods and the retaliation he draws upon his industry. We recognize no difference of importance between increasing the lumberman's de-



WORK OF A VERY DESTRUCTIVE FIRE IN FOREST BORDERING A LAKE.



A TYPICAL FOREST SCENE IN EASTERN WASHINGTON

sire to protect and properly utilize the forest resources he holds in trust and increasing the public sentiment which will encourage him to do so. We believe that mutual benefit lies in mutual understanding, confidence and co-operation.

In bringing before forest owners the actual profit of better forest management and the equal advantage to them of earning popular credit by it, we depend little upon the conventions, associations and publicity methods commonly used to arouse forestry sentiment in the general public. We break into his own trade meetings and journals, where he has to listen, and take care to show that what we say is with full knowledge of his many problems. We write him letters and circulars, but do him the honor of making them as thoroughly his as would be a talk across his own desk. We ask him to make no sacrifices for posterity that we are not making ourselves, but we do try to show him that he can do much without sacrifice or at a profit. Particularly, when we do get his money or backing, we try to give him tangible return in something he really wants, like fire protection, as well as in things we think he ought to want.

If he wants to interest his neighbors in protection, we help him get them together, draft one or two prominent men who have tried it to go along and tell how it worked, carry with us an array of practical figures on cost elsewhere, and practically bulldoze the gathering into organizing a modern co-operative patrol. After they try it, they continue, and we see that they get a copy of every new idea in fire work that is ever evolved afterward anywhere. If a new spark-arrester is invented, they get a description of it. If someone discovers that powder will throw a trench faster than shovels under certain conditions, we tell them about it. If a supreme court passes on some doubtful point of a fire law, we analyze the decision and send it around. If a law is inefficient generally, we write a new one, organize a campaign for its passage, and pay the bills.

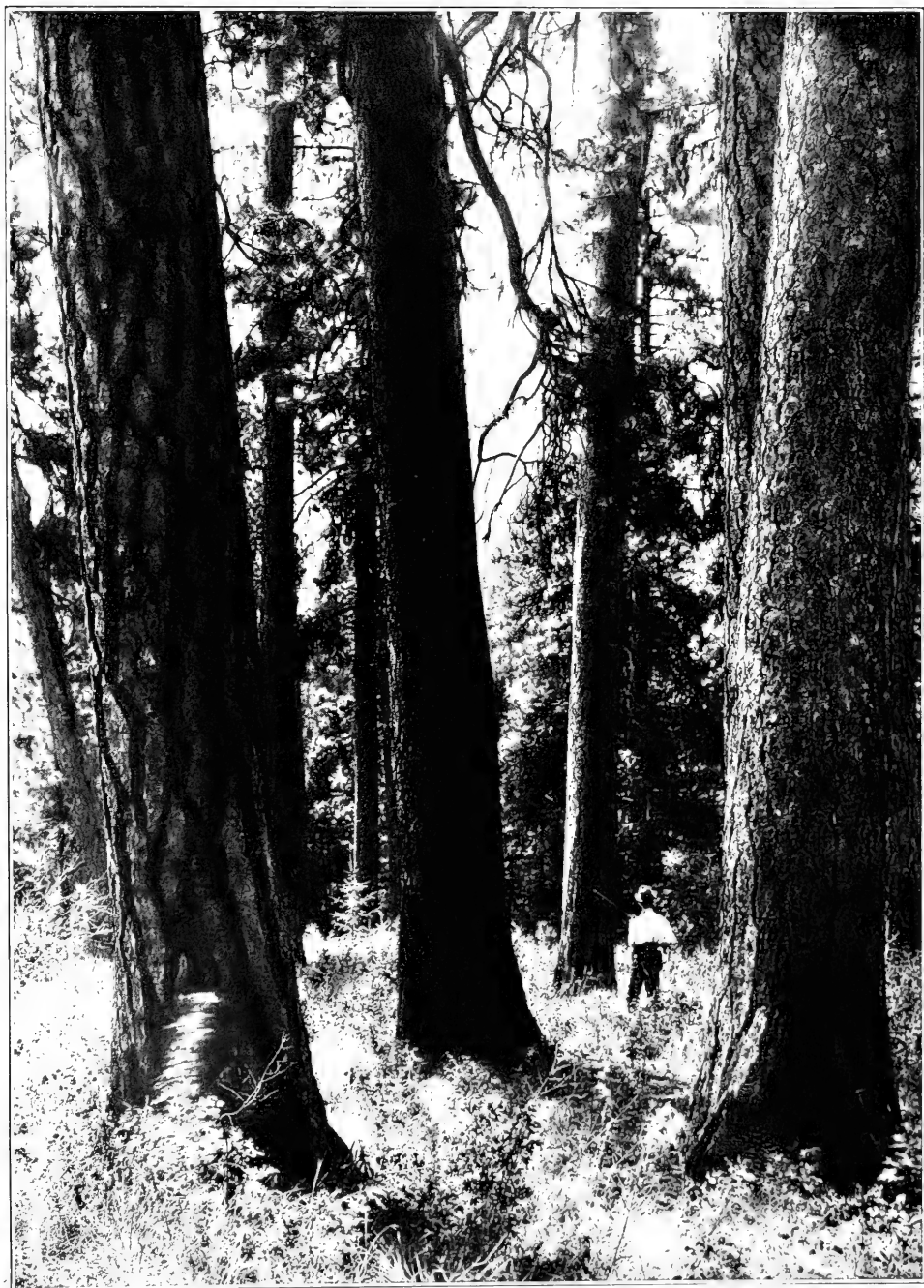
But probably you are more interested

in methods of general public education. In this we follow the advertising principles of continual effort to keep the impression from fading, and of novelty to insure attention. Probably the first form of anti-fire publicity was the old-fashioned fire-warning synopsisizing the law and its penalties and printed on cloth for durability. We originated departure from this to a poster saying little of the law but bearing catchy epigrammatic appeals to the reader's common sense and personal interest, and printed on paper so it can be replaced with a new one next year. Each year we use different text, type and color, and are now branching into pictorial signs depending little upon text of any kind.

Each spring we issue immense numbers of short circulars, with paper, colors and picture covers so attractive that they are not quickly tossed away, taking up in some new form the importance of forest protection to community welfare. One year it may be straight narrative, another a catechism with answers, another a parallel column device. Always different, always catchy. These are distributed in countless ways—as letter fillers by business houses, in railroad folder racks in public places, handed out or enclosed in packages by merchants, attached to documents and licenses by county officials, distributed from pulpits by ministers, dropped in rural mail boxes by riders, left at houses and on hotel tables by hundreds of fire wardens. Almost anyone will help if you give him the material and suggest how.

Similar distribution is given small gummed labels bearing terse sentences or symbolic pictures and issued by hundreds of thousands. They are placed on envelopes, advertisements and the like, also stuck on walls, signs and posts.

Every spring we get out something especially designed for school children, both to get them thinking rightly and to be shown their parents, and the State school authorities instruct the teachers to distribute these. Last year it was a sort of catechism with a picture cover, this year a little story investing a tree



PART OF A STAND OF YELLOW PINE IN SOUTHEASTERN WASHINGTON.

with personality and carrying it through all its forest struggles. These reach hundreds of thousands of children and the distribution of so many tons of material to the teachers by small mail and express packages is a serious undertaking. We also find a good opportunity in Arbor Day ceremonies, preparing material to be issued by State school superintendents in a special bulletin to teachers with instructions to make it part of the regular program.

One of the most pretentious projects we have undertaken is a technical manual of forest management for the Pacific Coast. Dealing not only with forest economics and protection, but even more with silvicultural problems and reforestation possibilities, it is practically the first western book of the kind and has wide circulation. It is used as a text-book in every American forest school, is in most important libraries, and was listed by New York State among 1300 best books out of 11,000 printed in 1911. Peculiar value of such a book as a sentiment-maker lies in that it carries forestry to the lumberman who would not read it elsewhere and carries his practical problems to the technical forest school.

We find both daily and technical press of value almost exactly in proportion to our systematizing its use. It is of great importance to reach the small country papers whose readers both use fire and exert much influence in legislation. To keep their interest we give them real news, using it as a peg on which to hang propaganda matter, and do this regularly. We send out to all our local associations and to State and Government officials blank forms asking for information, as for example on the fire situation at given times, and have these returned to us simultaneously so we can compile accurate up-to-date bulletins. These are so written that they can be shortened without rewriting and go promptly to about 800 papers with a release date like Associated Press dispatches. The papers know they can depend on these bulletins and use them widely. Occasionally we accompany them with lighter material like verse, which is very effective, or with

editorials. I have yet to see a single unfavorable expression upon the Western Forestry and Conservation Association in any newspaper and we get many letters and notices of approval. I attribute much of this good will to our systematic way of giving them news that they cannot get elsewhere, when it is new and in newspaper style.

Another publicity method both cheap and effective is to furnish material to others who will use it at their own expense over their own name. We send copy for fire warnings to State foresters and associations, suggest notices to be put up by railroads in cars and stations, and devise mottoes to go on checks and stationery. Every trans-continental railroad traversing our territory has our fire warning material in its summer time-folders. Telephone companies print it in their directories, and tell readers that exchange operators will put them in touch with fire wardens. Counties put guide-boards at road-crossings saying it is 10 miles to a certain town and do not start fires on the way. Many official State reports by boards and commissions present forestry material exactly as we write it for them. Speeches and reports before women's clubs and miscellaneous conventions are often supplied by us in full to the speakers or committees called upon to investigate the subject. Let any agency establish willingness to furnish such matter, and a reputation for absolute reliability and impartiality and it soon reaches audiences it could not appear before in any other way. Similarly it is often better to give a good article to a staff newspaper or magazine writer than to submit it yourself. He makes the money, but your doctrine appears without the discount of your own known special interest.

I could continue the list of such suggestions almost indefinitely, including calendars, framed pictures teaching some fire lesson to be put up in school houses, special folders to be handed patrons of garages and livery stables, combination game and fire law cards to be given sportsmen by gun-stores and license officials, the printing of like material on guide maps, stamped plates to



FOREST OF NOBLE FIR, HEMLOCK AND RED FIR IN OREGON

be attached to logging engines, cards bearing fire wardens' addresses to be tacked up near telephones, and many others. I think, however, that those already recounted will be sufficiently suggestive and I want to use the time remaining in speaking of the highly important subject of getting better legislation.

Neither my topic nor the time available warrants discussion of the policies to be expressed by forest laws, but with respect to engineering their passage, I can say that our experience teaches two cardinal principles of success. Harmonize and organize your support early and thoroughly. Do not depend upon lobbying, but exert your pressure through the legislators' constituents at home. Were I to outline a legislative campaign it would be about as follows:

Complete your bill two or three months before your legislative body convenes, but not before you have asked advice of all factions it affects and made it satisfy the sane majority of each. If it doesn't, the chances are either that it is not a good bill or that you have not learned to extol its merits convincingly. Then print it, with an attractive cover bearing the official endorsement of all the influential agencies you can enlist. This disarms suspicion, also the human tendency to tinker with it which will keep cropping up till it is either dead or signed. Precede the bill itself by a lively argument to engage interest, follow every section with full explanation of its particular need and meaning, and finish the booklet with a dire prophecy of what will happen if it is not supported.

Send this circular to everyone you can think of; lumbermen, ministers, women's clubs, bankers, merchants, newspapers and, of course, the legislators themselves; always with a special letter making an individual appeal for support based upon the recipient's vocation, and asking if he has any changes to suggest. He seldom will have, so you take few chances, and the majority are pleased. Anyway, you are out in the open. No one can say later he does not understand the bill. By time the fight is really on you have discov-

ered your opposition and how to meet it—a most important point.

In the meantime you have been perfecting mailing lists of two kinds. One is the widest possible, classified by vocations or other distinctions suggesting special arguments, and the stationery and signatures of the letters you send are as varied as the institutions you can get to let you use their prestige in this way. These addresses are classified again by their representation in the legislature and each receives at least one letter containing stamped addressed envelopes to his own representatives, with a request to write these demanding support of the bill unchanged. The majority will comply just because you have trusted them with a few postage stamps. The second list is of one or more people in each town whom you appoint local agitators to follow your instructions at any time without question. It is not hard to get such a list of lieutenants if you start your general letter writing campaign early enough. It develops through the replies you receive.

When the bill is introduced, do not lobby—at least not much. Ask every member whether he is for or against it, give him another of your printed explanations of it, and leave him pleased because you do not talk him to death when he has important business on hand. This is practically the sole job of your lobbyist: to advise you who is so sure to support you that he can be safely neglected, who needs pressure, and the stage of your bill every minute—its progress through committees, etc. With this information you marshal pressure from outside. What the reluctant members need is not your arguments for the bill, but expression from their constituents. You keep on writing letters by the hundred or thousand, occasionally sending out a flurry of telegrams to indicate urgency, always telling the recipients the particular members they are to write or wire to and what is needed, even if it is only to hasten the bill through a committee. And always emphasize that the bill is to be left unchanged.

If you have never tried such a campaign, two things will surprise you—

the readiness with which people will respond to suggestions that are exceedingly definite and somewhat flattering in assuming their influence is valuable, and the effect of this home endorsement not only in passing a measure but also in keeping it unchanged. One of the greatest perils of a forest bill is that it may be modified to make the resultant system a political machine. In dealing personally with members who attempt this, you are almost helpless if they make it a condition of their support. It is very different when they are obliged to offend constituents by defying their specific requests.

There are, of course, many additional devices to be employed. Wholesale and banking houses may be induced to request help for your bill as a personal favor of all their out of town connec-

tions. Friendly newspapers may use editorials to be clipped and sent each legislator. We once successfully killed a charge that a fire appropriation would benefit timber owners at the expense of the farmer by having placed on every member's desk a cartoon of a settler's house being destroyed by fire, surrounded by reproductions of dozens of actual clippings all describing loss of life or property by settlers, and bearing the legend "to vote against the fire bill is to vote for this." I cannot review all such devices, but the summing up is this: Do not rely on eleventh-hour lobbying with a busy legislature. Give your measure the earliest and widest explanation and systematize to the last degree getting the effectively applied endorsement of every man, woman and child you can reach.

FIRE DAMAGE SMALL

HERE has been less fire damage to timber in the Northwest this year than any previous year since the Western Forestry and Conservation Association has been organized, according to a statement by A. L. Flewelling, president of that organization. This year, he says, the fire loss has been practically nothing, in June there were a few fires on the coast, but in the Inland Empire, Montana and Oregon the damage has been almost nothing. Continuing, Mr. Flewelling said:

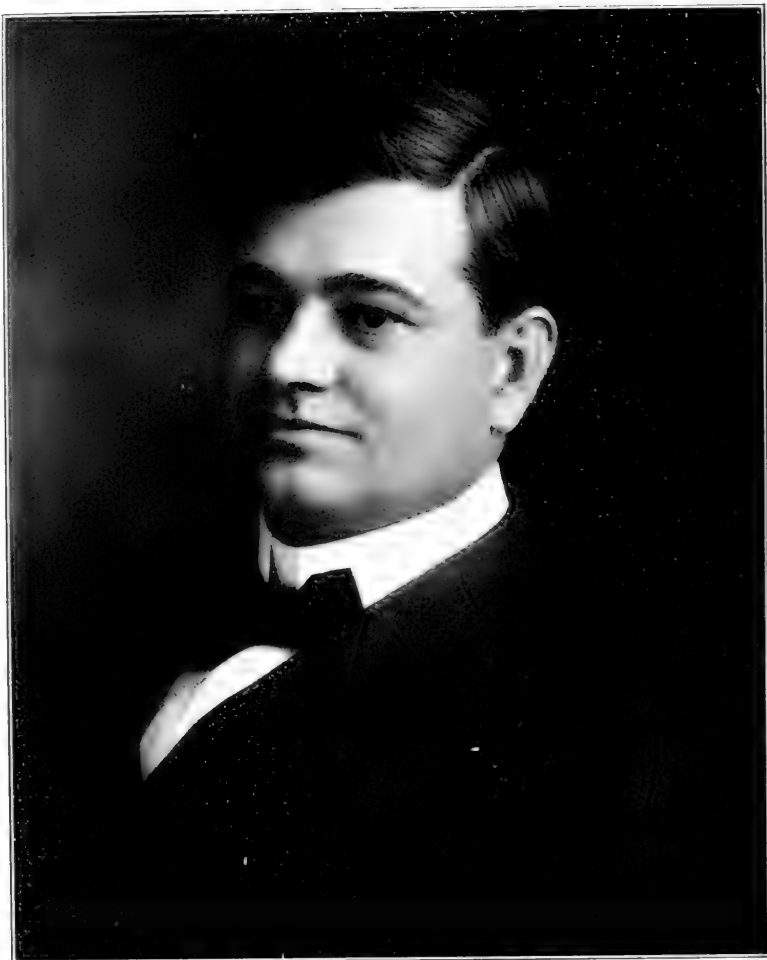
"The fact that the summer season has been a moist one is, of course, one of the principal reasons. There are, however, three other reasons that may help to explain the condition of affairs this year. The patrol system and organization of the timber protective associations have been perfected to a degree never attained before. Most of

the railroads have adopted oil fuel, doing away with the locomotive spark as a fire cause. The campaign of education that the association has been carrying on for years is beginning to bear fruit.

"Settlers and campers are exercising more care in leaving fires and are more ready to co-operate with the lumbermen in reporting them." The cost of the patrol service maintained this year has ranged from 2 to 3 cents per acre in north Idaho. Mr. Flewelling said: "A year ago the average assessment was 3 cents, while in 1910, the year of the big fires, the cost ranged from 12 to 15 cents per acre. This year most of the patrol forces have been used in building telephone lines. These lines and lookout stations have been established in sections never reached before."

E. C. PEGG APPOINTED.

Mr. Ernest C. Pegg has been appointed instructor in forestry at the University of Missouri. Mr. Pegg was graduated from Wabash College and from the Yale Forest School in 1911 with high honors. Since graduation he has been in the employ of the U. S. Forest Service, with headquarters on the Jemez National Forest, Arizona.



HENRY E. HARDTNER, PRES., LOUISIANA FORESTRY ASSOCIATION.

SOUTH'S TIMBER DISAPPEARING

BY HENRY E. HARDTNER,

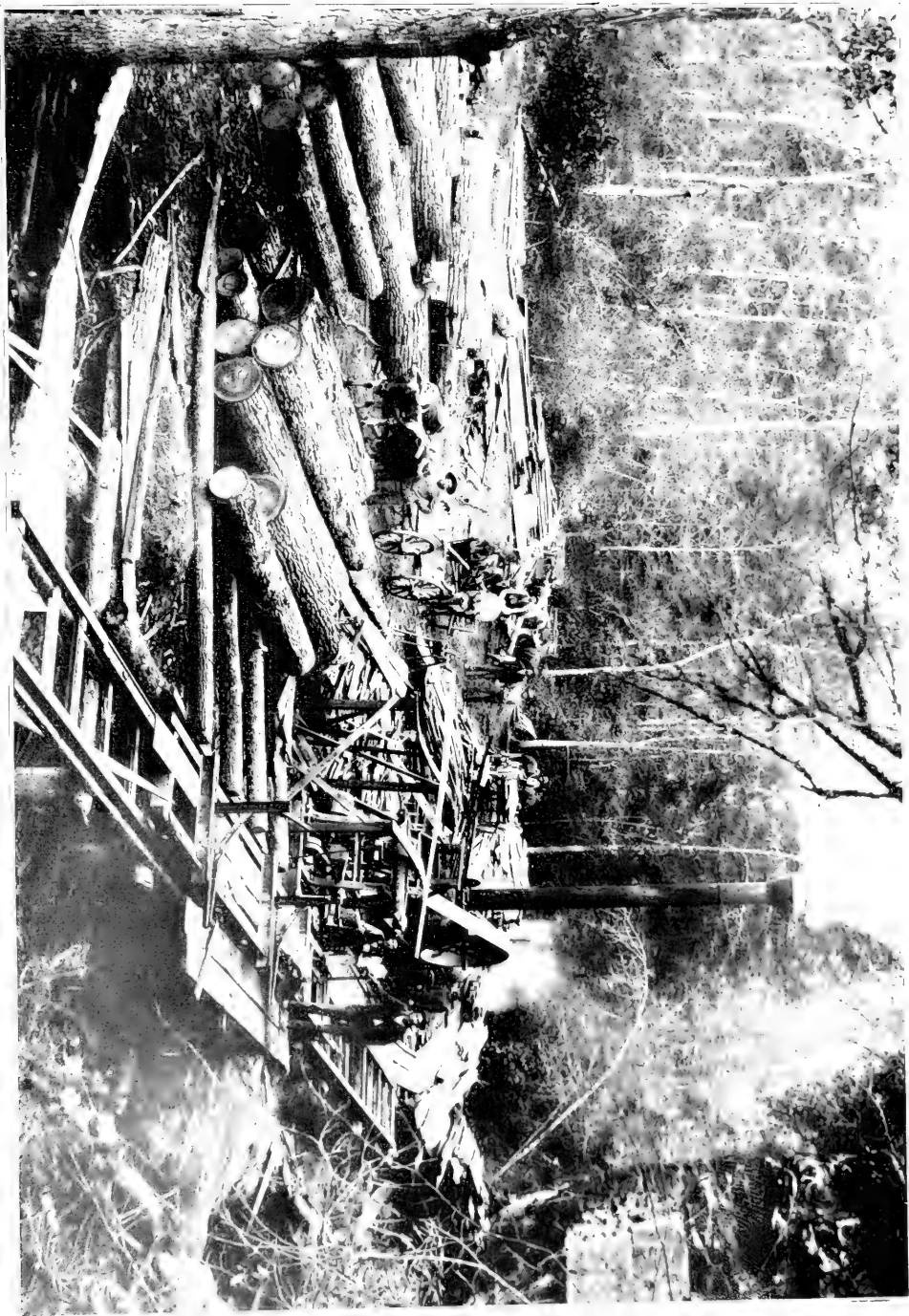
President Louisiana Forestry Association

IT is a well known fact that the forests of the South will be completely exhausted inside of fifteen years at the present rate of cutting. I have studied forest conditions in every Southern State and have conversed with well informed lumber operators and timber owners and am fully convinced that the present supply of virgin timber is nearing exhaustion. It is sad for one who has grown up in the

forests and who saw them in their virgin splendor to witness their complete destruction. Yet, we must consider that the trees are ripe and full grown and should be utilized to the best advantage, and that it is not criminal to denude these magnificent forests. Where we deserve censure is in failing to enforce reforestation on lands chiefly valuable for timber culture.

The present rate of cutting timber for

A FOREST SAW MILL IN THE HILLS OF EASTERN TENNESSEE.





ERODED SLOPE, FORMERLY HEAVILY WOODED, IN WESTERN NORTH CAROLINA.

the market will decrease from year to year from now on. The highest average has been reached—the forests are now in the hands of actual operators who of all manufacturers are forced to purchase raw material for years in advance in order to insure a safe return on the great cost of erecting mills, houses, railroads, etc. There will be few if any sawmills erected by new companies. A number of large mills will go out of commission year after year because of the exhaustion of their timber supply—the companies now operating will not increase their output—consequently the life of our virgin forests will be prolonged. Another factor in prolonging the life of virgin forests will be a reasonable price for lumber which will enable the operator to make a profit. A reasonable price for lumber will enable a mill man to cut 25% more timber from his lands. There will be no more profit for the manufacturer on the actual cut when the average

price f.o.b. mills is \$20.00 than when the average price is \$15.00 for this reason—it will be more expensive to save the extra 25% increase in stumpage which is now wasted because it can not be profitably handled. The average lumberman is a true conservationist. He does not wish to waste any product of the forest—but he can not operate his mills many years at a great loss. So when the average price of lumber is \$15.00 he is forced to leave 25% of very low grade lumber in the woods. His average per cent of upper grades is much larger on a \$15.00 average than it is on \$20.00. A \$20.00 average for next three years—a \$25.00 average for the five years thereafter and a corresponding increase from year to year will enable a person to reforest his denuded lands and grow trees at profit and as a safe business investment.

To sum it all up—an average price of \$20.00 will enable the lumberman to get 25% more lumber from his lands,

thus increasing the life of the virgin forests ten years. It will also enable and encourage the land owner to grow trees for the market so that when the virgin timber is gone there will be new forests to take their place. The cost of growing timber where the State fixes a valuation of one dollar per acre for taxation purposes on the land for thirty or forty years and does not tax the growing timber is as follows:

Assessed value \$1 acre for 30
years and compound interest

at 6% -----	\$1.67
Present value of land-----	3.00
Cost of planting trees per acre--	5.00
Compound interest for 29 years	37.94
Care of timber at 2 cents acre and compound interest-----	1.67
Total cost-----	\$49.28

There will be 5,000 feet per acre in 30 years' time at a cost of about \$10.00 per M. feet. It's a good investment—a good clean business to engage in.

IS LUMBER A CRIME?

By GEORGE H. HOLT

ONE man has made a national newspaper reputation by declaiming against the "Criminal Match." Another has made a tour of the country to exploit his catch phrase, "The shingle roof is not a covering, but a crime."

The Fire Insurance propaganda with its ninety-odd class-periodicals is promoting mass meetings in every State and city denouncing all forms of wood structure and utility as guilty of the "National Disgrace" of fire waste, and denouncing all responsible officials as criminals who do not use their official positions and power to prohibit its use.

The sensational press has heedlessly and ignorantly joined in the hue and cry, and the unenlightened portion of the "dear people" which takes its tone from head lines is hurling stones and clubs and epithets at the "Lumber Trust"—that mythological, disembodied Banshee—in blissful ignorance of the facts and of its own best interests.

Our natural enemies, the purveyors and manufacturers of competing material, and novel, untried substitutes, are spending mints of easy money in advertising and promoting the sale and use of their pet fads, and are not conscience-smitten when they decorate their pronouncements with all the lurid colors which they can borrow from their evil-disposed or ignorant collaborators.

Building ordinances and restrictions are enacted and enforced upon the false assumption that if matches and mice and shingles and lumber and every form and use of wood were prohibited, property and life would be forever safe from the Fire Hazard, and everybody would be happier.

In this hour of unrest, when any demagogue can get a hearing by proclaiming that "Everything that is, is wrong," the likelihood is that we are on the road to destruction of much that is good, along with some things that are bad. A wrong diagnosis leads to a fatal disaster, when a right diagnosis might prolong life and happiness.

What about the criminal match? The tests made by the Underwriters themselves disprove that charge. They show that "safe" matches share the responsibility equally with "unsafe" matches. It is the careless use of matches, not the matches themselves that should bear the blame.

The actual tests of "mice and matches" and "rats and matches" reduce to ridicule the tabulations of losses from those causes, although they have become a standing scare-head in all annual reports of fire loss.

What about the "Criminal Shingle"?

There are no statistics worthy of the slightest respect which tend to justify that false alarm. Think of the eleven million and odd buildings in this coun-

try and consider what an enormous percentage of them are and have been roofed with shingles. How many cases have come under your observation in which the shingles were the cause of the fire? How many cases in which the shingles actually spread the fire to adjoining properties?

The great values and the great losses by fire in this country are not in shingle-roofed buildings, and never were.

If shingle roofs are really the "criminals" that they are painted why do not the statistics show it? Why do the insurance companies compete so strenuously for frame residences, farm houses and barns, school houses, churches and public institutions, roofed with shingles, if shingles are "Not a covering, but a crime"? Why do they rate these properties among the lowest in the list, and then give away from 40 to 55 per cent of the premiums to get the business, if "Shingles are a crime"?

Where was the "Conflagration" for which shingle roofs were responsible? Doubtless some fires have been started in shingle roofs and some have been communicated in that way, but I do not know of any statistics which tend to show that shingles are a peculiarly bad hazard. The analysis of thousands of fires attributed to "sparks," taken as they run, shows as many fires in buildings not having shingle roofs as in buildings having shingle roofs. This fact is noteworthy, because there are a greater number of buildings roofed with shingles than with any other material.

It would be natural to expect, therefore, that any comparison by numbers of fires would show a greater number of fires in shingle roofed buildings, but that is not the fact in this case.

The appeal to experience and to statistics alike acquit the shingle roof and damns it defamers.

How about structural uses?

Wood construction is as old as the human race. Fire proof construction may have had "a look in" in the Stone Age, but it was not a winner in the race for civilization. As for iron and steel and concrete and plaster and cement, their story is a short one, and

their comparative merits as all-around and economic and livable are not established.

Admit that they have certain distinctive merits under certain conditions and limitations, and you have given them all the credit that they are entitled to.

It is certain that iron alone is an unfit substitute. Examine any annual report of fires in a State or city and you will find abundant evidence of that fact.

Concrete and iron, properly combined and proportioned, are a worthy pair for certain purposes, but, although their number is less than one per cent of the whole number of structures, they contribute a very large percentage to the fire waste.

Fire and electrolysis and water and changing stresses are fatal to their life and usefulness. As to the safety of life and limb in unsprinklered "Fire-proof" buildings, the indictment against them is more terrible than against any other class.

And yet we would not say that an unsprinklered fire proof building is a "crime."

Their record in every great conflagration is a record of total loss of contents, and for the most part, worse than a total loss of structure.

A sprinklered fire proof structure, properly constructed, is about an equivalent of a "mill-construction" (wood interior) building, from the fire hazard standpoint.

Edward Atkinson always held that the mill construction was the better, and for many years discriminated against the fire proof sprinklered in favor of the mill sprinklered structure.

The records of the New England Factory Mutuals are a monument to his sagacity in that respect, during his life time.

What about timber construction?

To paraphrase Daniel Webster, "The world knows it by heart." Dry wood will burn. Wet wood will not. You must evaporate the water first. The Automatic Sprinkler solved that problem. It wets the wood while the fire is small, and keeps it wet until the fire is

out. There are some sprinkler failures, in both fire proof and timbered buildings, due to defects of construction or to accidents which cripple the equipment, but the actual experience of fire loss in thousands of sprinklered timbered structures, carrying hundreds of millions of insurance, is below one per cent. As these buildings are mainly factory buildings, housing inflammable materials and operating machinery, all of which contribute enormously to the hazard, the record is a phenomenal one, and the case is proved in favor of the reasonable use of wood in structural work. The great majority of fires start in contents or equipment—not in the structure. If all buildings were properly sprinklered, and the sprinkler equipments properly maintained, there would be no spreading fires, and consequently no conflagrations.

The fads of wired glass and metal trim and furniture would be relegated to the scrap heap, and buildings would be livable and beautiful and economic, and life and property would be safe from fire.

But that is the extreme.

It is not necessary or desirable to go that limit. It is only necessary to protect congested areas and values and occupancies, leaving the small and moderate hazards to the control of a fire-fighting force of moderate, though ample, size to subdue it.

This condition can be established in any city in a short time, and without adding any burden not already borne. It is what I have called "Normalizing" a city—that is to say, reducing its haz-

ards to a normal size, so that any possible loss would fall within the limits of a profitable relation between cost of construction, maintenance, protection and loss without disaster.

We have no quarrel with those who seek by fair means to sell competing materials. We have no quarrel with those who seek by fair means to enlighten the public to a due sense of its responsibility for fire waste. We have no quarrel with those who seek to bring the public mind to a state of carefulness and caution in the matter of fire hazard.

We do not urge the exclusive use of wood for all purposes.

We do not object to reasonable restrictions upon unfit methods of construction or use of materials.

We do have a right to denounce a false propaganda, which, to serve its selfish ends, defames us and our industry with reckless and unjustifiable misstatement of facts, and by playing upon the prejudices of the uninformed and gullible portion of the public.

We perform a service to the public and to the great number of persons who are engaged in collateral and related industries when we do so, as well as to our own great host of citizens whom we are proud to call our "fellow lumbermen."

What we need is an unbiased and competent investigation and report, under the authority of the National Government, which will ascertain and disclose the facts in an adequate and trustworthy manner.

QUEBEC'S LUMBER RESOURCES.

The timber resources of Quebec are enormous, though greatly diminished in past years by forest fires. The privately owned timber lands comprise about 6,000,000 acres and are able to supply 500,000 to 1,000,000 cords of wood per annum for years to come. The Island of Anticosti alone is able to produce 80,000 to 100,000 cords per annum for years, a good portion of which, however, will probably be converted into pulp in the near future, as a large mill is now in process of erection there. Pulp mills are also in process of construction in other parts of this district, so that the pulp industry, especially in this district, is bound to witness a great boom in the near future.

AMERICAN FORESTRY

By JEROME H. SHEIP

Philadelphia, Pa., Box Manufacturer

IT is particularly gratifying to note the growth in technical efficiency by which we are rapidly realizing the best ideals in the management of our public forests. We recognize that a great field of usefulness awaits our efforts in bringing about a more economic management of private forests. The forest reserves which were created in 1891 and later more appropriately named "National Forests," have been increased in area, and now include about 190,000,000 acres. Many State Forest Reservations have been created and established, so that, at the present time, about one-fifth of the forest area in America is owned by the public. To this extent, a great system of management has been established, looking toward the protection, improvement and wise use of our timber supply, which has been insured for the present and future benefit of all the people—aiding private owners in reforesting waste lands and in educating the public in the best methods of handling timber lands and providing efficient fire protection.

The total amount of timber cut in the United States in 1900, was thirty-five billion feet; in 1905, thirty-eight billion feet; in 1909, forty-five billion feet. These figures show an enormous increase demonstrating beyond question, the importance of extending the practice of forestry to commercial lumber operations. Business in a large measure, is now hospitable to forestry—seeking to understand its principles and find out how they may be applied, and the most cordial, thoughtful co-operation is due from the forestry profession.

While it is true that some of the greatest fortunes in the country are based upon lumber, they have been made by treating lumber as a speculation and not as a business, by holding



JEROME H. SHEIP.

and reselling, not by cutting. The writer contends that if the timber owner could afford to wait fifteen years, if he charged his investment at six per cent and compounded it annually, and sold at the end of that term, his profit would generally be greater than if he had cut his trees into lumber. This practically means that the saw-mill man is giving away his manufacture for less than it has cost him, as he is not getting the appreciated price of his logs. The average way the man who owns both a mill and a forest figures his cost is this: he buys his timber at an estimated stumpage value of \$2 per thousand. He puts up a saw-mill after waiting several years, and by the time he is ready to operate, the general price for stumpage is \$5 per thousand; but he argues, I paid \$2, and therefore

stumpage is put on his cost records at \$2 instead of \$5, because he is selling the timber to his own mill instead of to somebody else. On this miscalculated cost he makes a price that gives away the manufacture for less than it cost him above the price of the timber.

Nor is this all; the lumberman is getting nothing for the risks of engaging in one of the most precarious and difficult of operations. In the South, which engages principally negro labor, insurance men tell us that more than ninety per cent of the lumber mills burn out every ten years, and no matter how thoroughly insured the lumberman may be, he will certainly lose in a fire. For the ability, the genius who can conduct the lumber business as a permanent concern under the present conditions has yet to be discovered. The saw-mill as the center or focus of the business, possesses this peculiarity; when it is placed in a locality, it immediately begins to cut a circular swath about it. As more capital is invested in the plant to make it more efficient, it means that the life of the plant is being shortened, as the swath in which it will pay to operate will be cut more quickly, and a move will be necessary the sooner, with all the loss incident to readjustment and re-establishment. The question in such a case is how to charge depreciation, for as the plant has only a running value, every doubling of efficiency of daily output, by a doubling of capital invested, would mean the quadrupling of depreciation. In other words, the fact that our forest policy is based upon a plan of depletion, has made the keynote of the business "cheap, inefficient and temporary." Like the Nomadic Indian, we have spread our wigwam upon the fertile prairie, and when the game was hunted out, we have moved to more fertile fields. This lack of permanence, or even discouragement of permanence, has been the bane of the saw-mill business during recent years. The fact that saw-milling has been based upon the premises of a change of locality each five or ten years has deterred the most valuable type of conservative business man from entering it as his life work, and

invited speculators who have exploited the natural resources with little thought beyond the material pleasure of the day.

We shall always have the speculative element in our midst, but the men who represent it should not be permitted to manage as a private business what is a vast matter of public concern and what will be so difficult to replace when lost. It is not only that when the present crop of trees is cut, it will take approximately a century to grow a new merchantable stand but that it will take two or three centuries to return to the quality of our present virgin timber. Forests are not merely trees; the aggregation of many trees in one place creates forest conditions, and betters the timber for commercial purposes. These forest conditions have to do with such factors as soil cover, constant shade and constant reproduction. Once the sun is permitted to touch the soil and dry it out, we must begin from chaos again. Nor is the denudation of the soil a matter merely of taking off so many trees, as we are informed that the forests are watersheds acting as balance wheels upon the inequalities of climate and that if the tree cover is removed, we shall be exposed to the violence of alternate freshet and drought.

These are the conditions that have brought the issue of conservation to the attention of our people, and made it and Socialism the paramount and only really important political issues of the day. The conservation of forests is but a branch of the large general movement for the conservation of everything from child life to coal smoke; it means that instead of doing the most obvious thing in a tremendous hurry, we shall, in the future, calmly weigh and plan to what end we are going. The trained forester feels that in an ideal world that nation would be happy whose government realized that the great public necessities which span more than one generation in their circle, should be placed beyond the greed of any one generation, and as the national government is the most permanent element in our civilization, it is most fitted to exer-

cise this function. As this was not realized a century ago by the framers of our Constitution, the forester now asks that the same step be taken as in all other business—to stop and inventory our methods, in an attempt to remedy the evils that will no longer be glossed over. As a first step to this, we are to set aside certain lands that we can still obtain, as a temporary injunction to further abuse. Where President Taft has erred, with all good intentions, has been that after certain lands had been closed by a free interpretation of an act which gave the President power to close those lands, he threatened to destroy the entire forest policy of the nation by returning them upon a technicality. Technically and literally, he was probably right, but no technicality could restore the land to us, once it were lost.

Coincident with this movement for technical and scientific forestry has been another quite as important which has taken its initiative in the practical commercial world of affairs—conservation by conversion of waste into by-products. Not all of the forest trees are considered valuable for commercial purposes and as we have weeds springing up among the lower plant life of the soil, we have weed trees. Examples of this of recent date are the use of beech, and tupelo, and the treatment of discarded species of pine with preservatives such as creosote. Some twenty years ago, not more than half of the trees were taken down at the first cutting, as the rest were considered useless. Of the trees that are taken from the forest, not one-half of the original volume goes into the final product. The roots and branches make up one-third or more of the woody volume, but are left in the woods, while the dust taken out by the saw, the slabs and trimmings reduce the volume an additional fraction. Just recently, we have found that all or part of these unused pieces yielded paper pulp, alcohol, resin, turpentine, tannic acid, and the day is doubtless very near when the sawdust burner will be considered a public disgrace, when no saw-mill can be run profitably without working up its waste;

or we may see the day when a saw-mill will find it profitable to burn coal under the boilers in order to utilize the sawdust.

From conservation it is not a great step to the exercise of forestry as a science. The final idea of forestry is to treat trees as a soil crop, as grain is treated, with this difference—the time of rotation. Ordinarily the time of rotation for a soil crop such as grain or fruit is one year, but in forestry this is increased by one hundred or more fold, or three natural generations. This, however, is counterbalanced by the stability of the crop and the certainty of return, for the forest has but three enemies, fire, wind and vermin, reduced under scientific forestry to an absolute minimum. By certain technical and not very complicated methods, forestry keeps a continuous growth of trees of all ages from seedling to mature trees in its forest, and endeavors to cut each year only a number of large saw-log trees corresponding in volume to the amount of woody material put on by the entire stand for the year; it keeps the ground shaded, and finding out the peculiarities of the soil, favors those species most fitted to it. It would probably be impossible to get a private individual to engage in such an undertaking from a purely commercial viewpoint, as the amount of capital tied up at compound interest for a rotation of even sixty years would be very considerable. We must look to the government to come forward and, if not take charge of such an undertaking, at least to encourage it by beneficent laws that will overcome the present handicap of unscrupulous business over public spirit. We have given protection to develop many unworthy infant industries by a protective tariff, and yet here the most worthy of all industries, in the most need of protection, receives no encouragement. The least the government can do is to relieve those who have placed their forests under scientific management, of the burden of taxes during the first crop rotation.

THE PRESENT STATE OF FOREST TAX LEGISLATION

BY FRED R. FAIRCHILD

Dept. of Economics Yale University.

THAT there exists a direct connection between taxation and forestry has been more or less generally recognized for some time. The exact nature of this connection, however, has never been well understood in this country. Persons interested in forestry have seen that taxation was a serious obstacle, and legislatures have frequently been willing to give relief by means of special legislation affecting the taxation of timber lands. In the absence of an understanding of the true relation between taxation and forest growing, this legislation has until very recently all gone off on the wrong track. The good results hoped for have not been accomplished and the problem of forest taxation is still unsolved, is in fact more pressing than ever before.

In what follows I shall undertake to describe briefly the present state of legislation in the United States affecting the taxation of forest lands and to show why the special forest tax laws enacted up to the present have not proved effective.

The taxation of forests is a matter of State and local revenue. There is no taxation of forests by the national government. The legislation is all State legislation. The basis of local revenue everywhere in the United States and of State revenue in very many of the States is the general property tax. Everyone is familiar with the principal features of the general property tax. As a rule all property, real and personal, tangible and intangible, is subject to taxation, unless specially exempted by law. Forest lands are subject to the tax the same as any other kind of wealth. The law requires that the actual market value shall be assessed, which in the case of forests means the full value of land and trees.

Of course it is a matter of common knowledge that the laws are not enforced as regards the requirement of an assessment at full market value. The tax is collected annually at whatever rate is required to raise the necessary revenue for the town, county, State, and other public bodies depending upon the general property tax.

This, in brief, is the normal tax system to which forests are subject in the United States. Only where there has been special legislation are forests treated differently from other kinds of wealth. Of the forty-eight States of the United States, thirty-four tax forest lands under the general property tax in exactly the same manner as other lands.

The other fourteen States have enacted special legislation affecting the taxation of forests. These States are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Alabama, Michigan, Wisconsin, Iowa, Nebraska, North Dakota, and Washington. The idea in the legislation of all of these States has been to encourage the planting and cultivation of trees or the general practice of forestry by offering special inducements in the way of reduced taxation. These concessions take the form of entire or partial exemption from taxation, rebates of part of the taxes, or bounties to be deducted from the taxes. The method usually employed is that of tax exemption. The plan of a rebate is used in New Hampshire; North Dakota uses bounties, while Wisconsin uses both exemptions and bounties. In some of the States there are two or more distinct laws, not always entirely consistent with each other. In most cases the statute is limited to plantations, and in five States the forest must

be established on land that is not wooded at the time.

The commonest form of tax concession consists of a complete exemption from taxation on both land and trees for a definite period of time, ranging from five to thirty-five years. The exemption begins either immediately after the land has been planted or set aside for the growth of trees, or after a certain period, measured either in years or in the growth of the trees. In other States the concession is by means of a rebate of part of the taxes for a certain number of years, as in New Hampshire, or by means of a bounty of so many dollars per acre to be deducted annually from the taxes on the land, as in North Dakota and Wisconsin. Usually the owner is required to manage the forest in accordance with regulations specified in the statute or under the direction of some State officer or board.

Only two States depart materially from this general plan. These are the States of New York and Michigan, whose legislation, enacted in 1912 and 1911 respectively, will be considered in more detail below.

Four States, Illinois, Kansas, Minnesota, and Wyoming, undertake to encourage the growth of trees by offering bounties. Since these bounties, however, have no relation to taxation, I have not included them in this discussion. Likewise I refrain from discussing the laws of Massachusetts and Vermont, which provide for the offering of annual prizes to encourage the planting and cultivation of trees; these prizes also have nothing to do with taxation.

The general type of forest tax legislation which has been followed by our States until very recently has failed to produce any appreciable results. Of this fact there cannot be the slightest question. It is important to determine the causes of this failure. In the first place the laws contain many technical defects. The common limitation to plantations, or even to land other than woodland, largely defeats the purpose of the laws at the outset. The regulations regarding planting, thinning, etc.,

are often faulty from the point of view of scientific forestry. Often the number of trees required to the acre is too large. The list of species designated is not always well chosen.

A more serious defect is the injustice to the locality where the exempted forest happens to be located. The only justification for a concession to the forest owner is the resulting advantage to the State as a whole. Yet the particular town or county where the land is located is called upon to bear the whole or the principal part of the burden of a diminished revenue. This tends, first, to lead certain assessors to try to get even by adding enough to the assessment of some other property of the timber owner to make up for the reduced taxes on his forest lands. In the second place it prevents many owners from taking advantage of the law, since they dislike to arouse the hostility of their neighbors or of the local authorities by an apparent attempt to get out of paying their share of local taxes.

Another vital reason for failure is that the actual financial consideration is not ordinarily very great after all. The exemption is limited to a fairly short period, after which land and trees are again subject to the general property tax. The abatement comes, of course, at the time when the trees are small, and the taxes would not be very heavy anyway.

Finally the whole principle on which these laws are based is, in the writer's opinion, a false one. The idea has been to give some concession, some special favor. This is not what is needed. There is no sound reason why the owner of forest lands should not pay his just share of taxation. And if forestry is going to be profitable at all, it can well afford to pay its just share. What is needed is simple justice, and nothing more. The general property tax acts as an obstacle to forestry, for reasons which cannot be entered into here. What we want is a new system, which shall avoid the evils of the general property tax by a change in method, but which shall still call upon the forest owner to bear his full share of the burden of supporting government.

Within the past two years two of our States have taken the first step, somewhat faulty and timid to be sure, toward a sound method of forest taxation. Michigan passed a law in 1911 and New York three laws in 1912. Without going into details, these laws provide for a separation of land and trees for purposes of taxation, the land

either exempt entirely or assessed at a low value, and the trees taxed only when cut, and then at a certain percentage of the value of timber cut. The operation of these laws will be awaited with great interest by all those who are interested in forest tax reform.*

*For a more complete analysis of State legislation, with abstracts of all the laws in effect in October, 1908, cf. "The Taxation of Timberlands," by Fred Rogers Fairchild, Report of the National Conservation Commission, Vol. II, pp. 581-632. The abstracts of State statutes are on pp. 588-589. All of the laws there described are in force at the present time. The following legislation has been enacted since then: Connecticut, Laws of 1911, ch. 205 (a more liberal exemption law). Maine, Laws of 1909, ch. 136 (amending Laws of 1907, ch. 169, by reducing the number of trees required per acre); Laws of 1909, ch. 193 and 230 (providing for a special tax on wild forest lands, the proceeds to be used for fire protection). Massachusetts, Laws of 1909, ch. 187 (special exemption relating to land stocked with white pine seedlings). Michigan, Laws of 1911, ch. — (referred to in text). New York, Laws of 1912, ch. 249, 363, and 444 (referred to in text). North Dakota, Laws of 1909, ch. 50 (slightly amending the previous statute).

WITH THE BILTMORE BOYS

THE Biltmore Forest School—51 students strong—is encamped at Marshfield, Oregon, fall camps of the School, during September. Here they are in the midst of the finest stands of giant Red firs, White Cedars and Sitka Spruce. The logging operations of our hosts—the C. A. Smith Timber Co.—are in keeping with the size of the trees; gigantic, ingenious, impressive. Marshfield is so situated that the students can reach the various logging camps of the company readily by a short boat ride over the many sloughs emptying into Coos Bay. A huge fibre plant is in course of construction; it is intended to utilize the waste of a saw-mill producing actually over 550,000' b.m. per diem. The logging operations will be converted into operations by electricity. A huge electric power plant is being erected. In spite of the enormity of its holdings, the directors of the company figure on a second growth and are careful in leaving a

sufficient number of seed trees on the areas logged-over. The second growth follows in the vague of the first growth with an amazing vigor; the rate of accretion exceeds 800' b.m. per annum.

The Biltmore Forest School has traversed, en route from its summer camps near Cadillac, Michigan, to its fall camps on the Pacific Coast, the forests of the Inland Empire, spending a number of days in the Coeur d'Alene Region, and has also visited the typical operations near Seattle and near Tacoma. The gentlemen of the U. S. Forest Service and the leading lumbermen have been untiring in their efforts to make the excursions of the Biltmore Forest School instructive. It is natural that the School is in clover particularly wheresoever its own graduates are the guides in the forests visited. The School sails for its German winter quarters in the early days of October.

THE PRICE OF FOREST PRODUCTS

BY FREDERICK S. UNDERHILL, *Phila.*

I WANT the duty on Lumber reduced," declared a Member of Congress, "that the mechanic may build his home cheaper!"

The duty on lumber was reduced by the Payne-Aldrich bill from \$2.00 to \$1.25, and after a year or more we find the price of lumber higher instead of lower.

What is the reason? There must be a "Lumber Trust" asserts the demagogue and the Yellow Journal. The search of the Government utterly fails to find a "Lumber Trust"; and what is more, the men who are in actual competition in the sale of the product of the saw, know that there is no man or organization of men who do or can control the price of lumber. When it comes to fixing lumber values the sole arbiter and rulers are those, intangible, yet effective, autocrats: "Supply and Demand."

At a recent Economical Conference in Philadelphia, a well known Single Taxer risked the unsupported declaration that Frederick Weyerhaeuser was the Autocrat in whom was personified "The Lumber Trust" upon whose whims the price of lumber went up, up, up! When he wanted a little more money he just raised the price of his timber, and every manufacturer was thereby forced to raise the price of his lumber.

That Frederick Weyerhaeuser has been far-sighted and wide-awake enough to acquire, while others were indifferent, large forests of timber, at times when they were inaccessible and therefore cheap, is an undisputed fact, and it is further true that much of it has since become accessible, marketable and valuable. The writer does not know the man, but I see no reason why in this matter he is any different from Philadelphia's great Philanthropist, Stephen Girard, who when certain large sections of Philadelphia were away

from the business center of his day, was far-sighted enough to see that Philadelphia would grow and bought largely of real estate which was valued lightly at the time but which has since increased in valuation many hundred-fold.

Mr. Weyerhaeuser is interested in several lumber manufacturing companies. He and his associates can fix the price on the lumber they saw, but there their price-fixing power ends. Every other lumber manufacturer and dealer fixes his own prices and sells at whatsoever prices he will without any regard to Mr. Weyerhaeuser. If he wants to sell lumber in the markets where our firm sells lumber he must meet our competition!

The producer of one kind of lumber cannot afford to disregard the capacity of the producer of other kinds of lumber. Scarcity of White Pine and consequent advanced values affords an opportunity for cheaper Short Leaf Yellow Pine to secure a foothold which it never relinquishes. Scarcity of Poplar and higher prices affords an opportunity to Cypress to demonstrate its value as a substitute and once established it becomes a competitor and not a substitute. Scarcity of Oak, Walnut, Mahogany affords similar opportunities to Birch, Chestnut and Red Gum.

Well, how is it that prices are advancing? Something more effectual than legislation has caused it. You cannot legislate value into a board or plank, nor out of it!

First, in point of influence in affecting present prices, were the disastrous floods in the Mississippi Delta: destroying numerous saw-mills; wiping out logging camps and destroying equipment; washing out main and branch railroad lines and logging roads, and effectually closing down a large number of saw-mills for many months, affecting Yellow Pine, Cypress, Oak, Ash, Gum and other lumber.

At the same time, the Appalachian District and the South Atlantic Slope experienced a prolonged period of persistent rainfall, making operations in the woods difficult and at times impossible, as well as making the hauling of lumber that was sawed back in the woods impossible because of bad roads. Thus, cutting down the production of North Carolina and South Carolina Pine, Appalachian White Pine and Hardwoods.

Canadian mills are reported also to have had greater difficulty than usual in getting in their logs and thereby reducing the output of Canadian lumber.

The reduced demand for Tan-bark because of former overproduction and the Tanning industry affected also by the uses of Tannic Acid produced from substitutes for Bark, has resulted in a reduced cut of Hemlock, inasmuch as

the mills cannot afford to cut Hemlock timber if there is no sale for the Bark.

On the other hand, the demand caused by increased activities in wood consuming plants, and especially by the railroads, in making extensions and in a renewed activity in car-building, has added value to the product of the Forest.

Supply and Demand establish the prices of lumber. If the supply is profuse and the demand light the prices fall low and no man or set of men can raise them; competition is mighty keen on a falling market. If the supply is curtailed and the demand is heavy the prices will advance and no legislation can change this fact, except destructive legislation aimed to destroy industries in general and to wreck commerce.

AMERICAN FORESTRY ASSOCIATION ENDORSED

AT the very successful convention of the Canadian Forestry Association in Victoria, B. C., early in September, at which the American Forestry Association was represented by E. T. Allen, of Portland, Ore., the widely known forester of the Western Forestry and Conservation Association, the following were among the resolutions passed:

"Believing that actual working co-operation between public and private forest management is essential to mutual understanding and complete success, we urge upon Canadian lumbermen the study and emulation of the lumber owners' co-operative fire associations of the Pacific Northwest, which are proving of great value not only in their own fire control but also in bringing about closer and better relations between all agencies engaged in forest preservation.

"Whereas, the proper disposal of debris resulting from lumbering operations is essential to the effective protection of forests from fire; resolved, that the association urges upon the Dominion and Provincial governments the

advisability as soon as practically possible of adopting measures to this end.

"Resolved, this Canadian Forestry Association is of opinion that it is in the public interest that squatting or settlement should not be allowed on lands that are chiefly valuable for their timber, and that all non-agricultural lands should be reserved permanently for timber production.

"Recognizing our common bond and common aims, we desire to testify to the achievements and practical assistance to the forest cause of the American Forestry Association, and hope for increasing co-operation between our organizations.

"Resolved, that this convention endorses the action of the Dominion government in setting aside forest reserves; that it urges further reservation of suitable areas and the retention of existing reserves in their entirety with the object of affording to the surrounding districts the best results for all time in regard to fuel and timber supply, grazing, and the production of game and the regularity of stream flow."

PUT YOUR CAMP FIRE OUT!

For Help, In Case of Fire, Call Upon the Wardens of the
NORTHERN FOREST PROTECTIVE ASSOCIATION
MUNISING, MICHIGAN

THE NORTHERN FOREST PROTECTIVE ASSOCIATION

BY PRESIDENT THORNTON A. GREEN

THIS Association was really formed in February, 1911, although some preliminary work had been done for several months before that. It was organized shortly after the severe fire losses of 1910, and the idea of having a private patrol was favorably received by the owners of several million acres of land. It was thought possible to have an organization for all of Michigan and Wisconsin, but we have finally decided to limit its operations, at least as far as maintaining a patrol, to the Upper Peninsula of Michigan. Few people realize the extent of this territory. We have eleven million acres of land, nearly half of it being covered with a dense growth of virgin timber, largely hemlock, with

a generous sprinkling of maple, birch, ash, cedar, spruce, pine, basswood, elm and balsam. Beech and red oak grow in limited areas. Our soil varies greatly, due to our having been visited by three glaciers in past ages and to part of the Peninsula having been covered at various times by three great lakes, Lake Algonquin, Lake Duluth and Lake Ontonagon. As usual, the glaciers left streaks of rather barren sand, which was covered with pine half a century ago, but are now desert wastes, or nearly that. A large part of the territory is very fertile, however, and the hemlock and hardwood stands are very dense. There are numerous rivers and some inland lakes. About eight per cent of the entire district is moun-

tainous. The highest mountains in the north central states are just west of Ontonagon, and the western half of the Peninsula is traversed by ranges of hills, interspersed by very fertile valleys. The railroads cover the entire territory pretty thoroughly, so that nearly all of it is easily reached. There are few locations more than fifteen miles from a railroad.

The remaining timber is owned by many interests, but there are large enough holdings to make it possible to patrol great areas of timber belonging almost entirely to our members. In spite of this we patrol a great deal of land not listed with our organization. Our entire membership embraces about two and a half million acres and we cover in addition to that about one and a half million acres, which is interspersed among the holdings of our members. The season of 1911 was favorable to our work, and except for a short period, this season has been. We use from 15 to 20 rangers whose duty it is to cover their allotted districts as often as possible. These men were picked from the woods' foremen previously employed in the districts they now patrol, as far as possible, so that they know their ground. They cover their fields in various ways; some on foot, some on horses and some on railroad velocipedes. They write daily reports to our Chief Forester, which they mail to him once a week. These reports are very complete, as shown by the following:

"Northern Forest Protective Association, Iron River District.

Iron River, Mich., June 23, 1912.

Thos. B. Wyman, Secretary-Forester, Munising, Mich.

Dear Sir: I hand you herewith full report for the week ending Saturday, June 22.

Sunday: At Bates and Sunset Lake.

Monday: Visited camping and fishing places at Hagerman Lake and vicinity.

Tuesday: On roads and amongst settlers on east half of T. 44, R. 34. Called on supervisor of Bates Township.

Wednesday: Looked after brush

burning on county road work, between Iron River and Beechwood. Visited fishing places along Iron River.

Thursday: Visited campers on south side of Chicagon Lake. Called on settlers in and around Pentoga. Visited Gibb's logging camp.

Friday: Attended a meeting and picnic of Iron County Grange at Iron River.

Saturday: Visited fishing places along Morrison Creek and Paint River in T. 44, R. 35.

Yours very truly,

WM. RIGSTAD, *Warden.*

Note to Wardens:—Report daily trips; streams; railroads and roads traveled; camps, homesteads and farms visited; calls upon supervisors and other wardens; people met in the woods; fires, trespasses and general conditions found."

All fires are reported at once. Hundreds of fires are put out each season despite the smallness of our force of rangers. Our work is necessarily to a great extent educational as yet, and I presume always will be. We have placarded every road, camping ground and berry picker's hut in the country we patrol, with signs of our own and those issued by the State.

We were astonished to find that only about two per cent of the settlers in outlying districts had ever read the State fire laws. We furnished them all a copy. Our rangers have called upon every homesteader and settler in their districts, and they have conferred with county, township and village boards in regard to protective measures. Until we took up this private patrol work, few officials would aid in fighting fires. Now, they all will. No difficulty is found in getting what help is needed. The State has made all of our men deputy State fire wardens. They have also included a number of woods superintendents and foremen at our request. We have had fine support from the local newspapers and in these various ways have become quite a recognized force. Apparently the people believe

NO FOREST FIRES THIS YEAR HELP! WILL YOU?

For Help, In Case of Fire, Call Upon the Wardens of the
NORTHERN FOREST PROTECTIVE ASSOCIATION
MUNISING, MICHIGAN

PIPES
CIGARS and CIGARETTES
===== A R E =====

DANGEROUS

A Fire From Your Pipe
Means That You, Alone, Are Responsible

BE CAREFUL!

For Help, In Case of Fire, Call Upon the Wardens of the
NORTHERN FOREST PROTECTIVE ASSOCIATION
MUNISING, MICHIGAN

IF YOU SEE A
FIRE
PUT IT OUT!

A Minute of Your Time May Save a Fortune
For Your Neighbor

Big Fires are the Results of Little Ones

For Help, In Case of Fire, Call Upon the Wardens of the
NORTHERN FOREST PROTECTIVE ASSOCIATION
MUNISING, MICHIGAN

CAMPERS AND BERRY
PICKERS

ll Campers are Urged to use every care with
===== FIRE =====
and to Leave the Grounds in Neat and Safe Condition.

You are interested in the safety of these lands or you
would not be here—let your interest be shown!

If you are seeking a better berry plain, trout stream, bass
lake or hunting site, ask the Wardens of the

NORTHERN FOREST PROTECTIVE ASSOCIATION
MUNISING, MICHIGAN

in our work and are helping us to accomplish it. Last season about eight thousand blueberry pickers were out on the marshes. In former years they have been the cause of many fires. Our rangers called on nearly all of them, and as a result we could not trace a single fire to that source. We have the hearty support of the lumber companies, railroads and settlers. We expect to keep hammering away in the hope, which I believe will be realized, that people will learn to be careful and avoid starting fires. We have done nothing towards putting in phone lines and watch towers, but have done considerable in the way of clearing up old logging roads or getting the township officials to do it, as these roads make good fire lines.

We have hopes of being able to increase our force considerably another year. There is a good chance of our acreage growing to four million acres soon. We spent five-eighths of a cent an acre in 1911, and will spend just

about that amount this season, and I believe our work will be more effective each year.

Through our efforts, largely, an organization similar to ours has been formed in Lower Michigan. So far we have failed to sufficiently interest the Wisconsin timber owners. Their holdings are now badly scattered and their problem is more difficult than ours. Nevertheless, they should do something along the lines we have been operating on. We will, in the course of time, carry our educational work into our State legislature with the idea of bettering our laws and eventually getting some sort of State patrol. At present we get no support from the State. Our Association is patrolling State lands now and receive nothing for it. We think we have accomplished enough to justify our expenditure of both time and labor, and will continue to use both for the preservation of our timber resources.

THE FIRE BUG AND THE EAST WIND

E. T. ALLEN

"No, I'll not burn my slash this spring,"
The moss-back logger said,
"I'll trust to God and luck again;
Expense is what I dread."

"It's time to hit the trail again,"
The careless camper said,
And left his little fire ablaze;
Within its leafy bed.

"I'll light another cigarette,"
The idle loafer said,
And chucked his old snipe in the brush
One end still glowing red.

"Let's punch the screen out of the stack,"
The donkey fireman said,
And so he did and all the sparks
Sailed blithely overhead.

"Come on, we'll dump our ashes now,"
The railroad trainmen said.
The train soon fanned them far and wide
As on its way it sped.

"Good time to fire my slashing now,"
The thrifty rancher said,
And touched it off without a thought
Of how far it might spread.

"I think I'll blow an hour or two,"
The restless east wind said,
Then liked it so he changed his mind
And blew a week instead.

"Millions in lives and timber lost,"
The newspapers next said.
What made those fires all start at once,
We wondered as we read.

"It wasn't us, it was that wind,"
The fools in chorus said.
So they're alive and loose this year
—We hope the wind is dead.

TWO SOLUTIONS OF THE FORESTRY TAX PROBLEM

By ARTHUR GOADBY

ONE of the most urgent needs of our growing conservation policy is a scientific method of forest taxation. At present the manner of assessment of private timber lands is unjust and arbitrary and permits the annual re-taxation of all the previous annual increment, thereby driving land-owners to hasty and wasteful lumbering as well as discouraging them from any replanting whatsoever.

These facts have led several of the States in recent years to attempt some sort of remedy either by exempting forested lands or by regulating the assessment thereof. But hitherto such experiments have met with small success largely because of their inadequacy, and largely because any legislation of this sort is exceedingly difficult to frame and still more difficult to enact, since many divergent interests are involved and in one or two instances well devised measures have been nullified by limitations in the State Constitutions.

Something, however, must be done and immediately, for public welfare depends primarily upon the forests. We have but to refer to such practical considerations as erosion, the washing of fertile soil from hillsides and slopes where it is of permanent value into river beds and harbors where it becomes a costly nuisance; to disastrous floods due to unrestrained torrents; to extreme climatic disturbances whereby sudden frosts and heat waves are carried far out of their normal zones, and whereby drought succeeds drought; and to the increasing scarcity and high cost of timber. Then we have but to refer to the great hygienic value of forests, for since prehistoric ages they have been nurseries of vigor; and to such aesthetic considerations as unsightly landscapes and barren mountain slopes, muddy rivers, streams dried up or littered with debris, and the thousand and one unpicturesque details which send

thousands of people and millions of money abroad to Europe every year to satisfy the craving for beauty. And then again we must refer to another practical detail, that our wastefulness is compelling us to buy at high prices from abroad the timber which Nature would bestow on us almost for nothing at home.

So vital are these matters to the Nation at large that scientific reforestation may well be said to be the most important and immediate question before us. Every effort should be made at once to secure a forest cover of at least one-fourth our total land area, a proportion now regarded as essential to every civilized community, and one actually existing this day in Germany. But since four-fifths of all the land in our country is in private hands it is obviously impossible, as well as unnecessary, to achieve this end except by encouraging forestry in some way on private lands, and it is also obvious that either the owners of these lands must be induced to engage in forestry or the different States must undertake to reforest these private lands themselves.

Today it is a question which method is the better, private or public enterprise. We are in an age of experiment and perhaps the better solution would be the latter, but certainly we should try both.

In either case it seems to me there are several cardinal principles that should be embodied in the law of every State, even though some amendment will need to be made first to their respective State Constitutions, namely:

1. Since immature standing trees have no financial value they should be exempted absolutely from taxation wherever existing, and

2. All private land in the State should be assessed at a value reckoned without reference to any immature

timber standing thereon, and the annual taxes should be collected therefrom, except that in the case that a private landowner shall request certain privileges under the law, and shall agree to certain conditions, hereinafter stated, taxes payable on his land shall be deferred until harvest provided his land shall bear a standard quality and density of immature trees. And all trees mature or immature that are harvested from such standardized lands should be liable for the total amount of all the accrued back taxes and their proceeds should go toward discharging this liability together with a harvest tax of 2 per cent on the stumpage value, before they be removed from the ground; provided, however,

4. That the district land revenues be not seriously impaired during the first general deferment period, before the general harvest reimbursements begin, and provided,

5. That land, timbered and not timbered, sufficiently valuable to tempt to tax evasion or to speculation, be denied deferment.

6. Which contingencies (4th and 5th) can be amply provided against by the following restrictions:

7. Let the State deny deferment to land situated within sixteen miles of a city of the first class, within eight miles of a city of the second class, within four miles of a town of the third class, and within two miles of a town of the fourth class, but let the State at first grant deferment to lands valued (irrespective of timber) at the average value of farm land throughout the State; and every year thereafter admit to entry land worth two dollars more (irrespective of timber) than the eligible land of the previous year, until

8. The eligibility be extended to land of such high value as (a) to begin (in the opinion of the Legislature and Governor) to tempt to speculation or evasion, or (b) until further deferments would far exceed harvest reimbursements, or (c) until the wooded area should exceed one-fourth of the total area of the State. Moreover,

9. No landowner should be entitled to enter for deferment less than one

acre or more than 1,000 acres in any one year, and

10. The number of trees required to secure the land deferment should be approximately not less than 700 newly planted trees, or approximately 350 newly planted and 350 old trees, to the acre.

11. The State should require its agents to inspect all plantations before granting the deferment, and

12. Owners should be required to give to the local assessors thirty days' notice in writing of any intention to cut all or part of the crop. The assessment should then be made upon the stumpage value of the proposed cutting, and the owner should pay the local collector before cutting the timber all the accrued land taxes together with the harvest tax of 2 per cent.

13. Failure to give such notice should bear a penalty, and the proper official should bring action to recover the amount of said penalty.

14. The State Tax Commission should be required to calculate the average value of farm lands throughout the State and report the same as a basis for legislation.

15. In case that any difficulty might arise to render inexpedient the deferring of taxes, a tax of \$.002 on every dollar of the whole land value of the plantation should be laid against the harvest, in addition to the harvest tax of 2 per cent on the total stumpage value of said harvest or harvests, such value might at present in New York (1912), be estimated at \$20.00 an acre.

The manner of fixing this rate of .002 on every dollar of the farm value is found as follows: Land worth \$1.00 an acre pays, at the rate of \$.0015, in fifty years the sum of \$.075, which is .0015 per cent of the gross receipts estimated as \$500.00. But land doubles in value in fifty years, hence the average rate would be about \$.002 on every dollar's worth of the total assessed valuation of the farm at time of maturity.

Now, while the enactment of these measures would undoubtedly encourage private forestry, it is possible that actual experience would show that few people might avail themselves of them. A

timber crop is more or less of a hazard and perhaps few would be greatly attracted by remote profits especially when interest, fire insurance, maintenance and taxes are sure to bring the ultimate cost to ten times the original investment, not reckoning meanwhile the loss of income from the property.

Forestry even under such equable taxation might be too great a luxury.

It is then probable that the State will find it necessary to enter upon a more aggressive policy and perhaps after all the only solution of the problem will be found to lie in a system of State loans and management. Extensive forests, like liberal educations, pay the highest dividends in the world. They save expenses besides creating revenues and certainly it is much wiser to expend one dollar to hold soil on the hills than to expend \$5 in putting it back again.

If, then, the State shall deem it wiser to at once begin a more speedy and effective policy it seems to the writer that some system like the following would be found constitutional and practical.

(1) Let the State first enact that all standing immature timber shall be exempted absolutely and forever from taxation, and,

(2) That all lands shall be assessed at a value reckoned without reference to any immature timber standing thereon.

(3) Then let the State either by annual appropriations or by an issue of 4 per cent 30-year bonds raise a special Forestry Fund, the proceeds of which are to be employed as follows:

(4) The State shall advertise for offers of land in blocks of 10 to 100 acres, and shall accept always the land having the lowest average assessment value, preferably on steep hill slopes.

(5) That it shall agree to pay to the owners an annual rental of 2 1-2 per cent of the assessed value of the land (irrespective of the timber thereon).

(6) It shall plant this land immediately with seedlings of standard density and quality.

(7) It shall pay annually to the local

tax district the tax levied on the land irrespective of the timber.

(8) It shall pay all fire insurance and maintenance charges.

(9) The sum total of all moneys expended upon each plantation, including all rentals, costs of plantation, including trees, seedlings and labor, local land taxes, fire insurance and maintenance charges, shall be reckoned up at the time of the various harvests, and such total multiplied by 1.025 (which is an average of 1.05 per cent), shall constitute a preferred claim upon the estate, and said claim, together with a harvest tax of 5 per cent on the stumpage value of the harvest, shall be discharged out of the various harvests, and the remainder of the proceeds of said harvests are to be the property of the owner.

(10) All mature growth to be harvested except where the Forest Commission should require the strategic protection against erosion and flood, and such excepted lands should be bought by condemnation at the price they would bring if cleared in the open market and the timber thereon bought from the owner at the prevailing stumpage value.

(11) One-half of one per cent of all lands so leased by the State shall be kept available as public camp sites and recreation grounds under restrictions set by the Forestry Department.

(12) This forward policy shall continue until one-fourth of the State area is under forest cover.

(13) All proceeds of the harvest taxes collected by the State shall be applied (first) to a sinking fund to pay interest and capital on the original issue, if any, of Forestry Bonds; (second) to buy the forests and land on the strategic hill slopes; (third) to improve fire-prevention service; (fourth) to destroy insect and fungus blights; (fifth) to encourage bird life, to planting trees and bushes along streams and highways, to prosecute timber thieves and firebugs, to improve water-ways, to buy lands in the suburbs for parks, to creating forest recreation grounds, to improve landscapes, to beautifying the

country under the supervision of the Forestry Department.

Are we too optimistic about the value of these polices to the State? A simple calculation, for instance, will show that in New York alone there are 4,000,000 acres available for forestry which could be made to yield an average income of \$3.00 a year. The an-

nual harvest tax of 5 per cent therefore would yield the State an income of half a million dollars, which would be a magnificent sum to expend as I have outlined, to the vast advantage of all concerned, for Nature is willing to shower its wealth upon us if we will only give it a chance.

THE SOCIAL SIDE OF LUMBER LIFE

By P. F. COOK

Assistant Editor St. Louis Lumberman

DURING the earlier period of American industrial history there was little opportunity for the play of the social graces of character in the industrial life of the average community. There was so much work to be done of a pioneer nature that the chances for social indulgences were few and far between. As a result of this there was evident on almost every side a certain bigotry and lack of breadth in the ordinary affairs of business. Business men in the conduct of their every-day affairs were as hard-headed and unsociable as men could very well be. Some of the uncouthness that is the invariable accompaniment of an undeveloped state of civilization was manifest in almost every phase of business activity. The result was that business lacked that warmth and geniality and the sense of brotherhood which evidently is becoming more and more prominent in the industrial life of the present time.

It was only natural that as progress made enlightenment possible and the barriers which separated men were broken down, that prejudice, bigotry, and the unworthy hatreds one business man felt for another should gradually disappear. Railroads, telegraphs, telephones, newspapers and the new gospel of universal brotherhood have pretty effectually shattered the old hard-

headed, unforgiving and barbaric ideals of even thirty years ago, and in its stead today we have more kindly feeling and broader ideals of the relationships between one man and another and a readiness to be of assistance in helping out a comrade in business.

This change is nowhere more evident than in the lumber business; in fact, it is doubtful if there is any line of industry in which there is so much sociability between those engaged in its various branches, as in the lumber industry. The organization of all the different branches of this business during the past twenty years is largely responsible for the change. Men who hitherto were strangers to each other now know each other well. Following the old scriptural maxim, "Come, let us reason together," men in every branch of the lumber industry have formed clubs and associations, city, district, state and national, until there is hardly a man engaged in one division of the business in any section of the country who is not more or less familiar with his fellow working in the same line in any other section of the country.

The lumber trade newspaper has been a factor in bringing this condition about. Publishing all of the news of the associations, acquainting their readers with so much of the personal and social life of the trade, they have served to open

up the minds of men engaged in the lumber business everywhere, helping in this way to make things pleasant for everybody and enabling their readers to become more familiar with the personal characteristics and business traits of the laborers in the various phases of the industry.

Next to the newspaper one of the influences that has counted for much has been the lumbermen's clubs, which are to be found in nearly all the principal centers of the industry. These organizations meet at least once a month and their deliberations are opened with a fine dinner in one of the club houses or hotels. One or two speakers upon vital topics are provided for and the repast is usually sweetened or rendered more delightful by a charming musical program by some leading orchestra of the town. The speeches are usually followed by a general discussion, all of which enables men to become better acquainted with each other's point of view and to learn to form new estimates and revise their opinions of men with whom they have been altogether insufficiently acquainted in times past. In the past two decades lumbermen have been cultivating the social side of their lives more and more, and during this period there sprang up what is known as the Concatenated Order of Hoo-Hoo, a fraternal body without an imitation or a parallel anywhere in the world. The purpose of this organization was to break the monotony of convention proceedings. These concatenations are of an unconventional character and the festivities which it fostered as a means of imparting new zest to the life of its members were quite unique in their character. Thousands and thousands of men all over the United States as well as across the water have worn the emblem of this order for a good many years past, and it is still a factor in the promotion of joyousness of spirit among those engaged in the lumber industry and related lines.

Readers of the lumber trade journals of the country will find nothing new perhaps in what the writer has stated above. It is so familiar to them that it has really become trite, but in this brief

space sufficient has been said to make it plain that the social side of lumber life has been very largely and successfully cultivated during the past twenty years, and that the spirit of comradery and the larger view which today obtains on all public questions among the men engaged in this great industry is largely due to the broad-gauged spirit in which the social side of their natures has been given fuller play during the period under consideration.

Man is essentially a sociable being. He is not a mere human cash register, and he develops best and appears at his best when all the god-like attributes of his character are given a chance to grow and an opportunity to display themselves in all their freshness and simplicity. To realize the truth of this nothing could be more convincing than to see some of the men whose names are foremost in the lumber business at one of the social sessions of Hoo-Hoo or at one of the many dinners or monthly banquets given in one of the leading cities by the Lumbermen's Club. A boy let loose from school is never happier than some of these captains of industry when free from the cares of business and given a chance to show what they really are man to man across the social board; in fact, it is no exaggeration to say that only those who frequent these affairs of associations and clubs really know the lumbermen at their best, and it is certainly a delightful experience to find that the man whom you thought was simply a relentless pursuer of the almighty dollar is also, in many instances, a genuine good fellow, filled with the milk of human kindness, touched by the pathos of human life in its everyday happenings, and responsive to what is poetical and emotional in all that concerns the affairs of the man with whom his interests in life are so intimately identified.

The social side of lumber life in the United States has certainly reached a degree of perfection that makes it well worth the imitation of those engaged in other lines who have not as yet felt the uplift and the sense of kindness that comes from a closer contact and an intimate knowledge of those engaged in similar lines or occupations.

LONG-BELL EXPERIMENTAL FARM

SUBMITTED BY VICE PRES. C. B. SWEET

ONE of the most effective agencies in the development, not only of Calcasieu parish, but of the State of Louisiana and of the entire South is the Long-Bell Experiment Farm, extending north along the Kansas City Southern Railroad from the mill town of Bon Ami almost to the corporate limits of DeRidder. Translated into English, "Bon Ami" means "Good Friend." The work done on this farm and the results already achieved prove that the Long-Bell farm is one of the best of friends, not only to owners of cut-over timberland and the communities to which they are adjacent, but to thousands of people who are destined to found happy and prosperous homes on land until recently looked upon as unproductive, and valueless.

The work of the Long-Bell Experiment Farm is by no means completed, although in seven years it has become an investment rather than an experiment; but it has already established the value of cut-over pine lands for the growing of fruit and vegetables. It has shown that vegetables of all descriptions can be produced in the open air weeks before they have matured in the populous section of the country and can be transported and sold at a fine profit. It has not only established that fruit growing is profitable, but by a series of plantings conducted with infinite care and watched with unwearied vigilance has established the fact that some species of fruit are sure profit makers and some are not profitable, and is still weighing others in the balance. Not only have all kinds of fruit been planted, but every variety of each particular fruit that promises any results, so that its records constitute an invaluable text-book for the farming of cut-over lands.

A feature of the utmost importance is that a cost system is in use on the

farm that is rigidly applied to every product on it. For instance, three men put two days labor each in cutting back the fig trees; that four others worked five and one-half days each on setting out orange trees; that two spent the week hauling fertilizer, and that two others worked spreading it where needed on the farm. The superintendent's record takes note of all this. The time spent by each man, and what he did, are charged up in the daily record. Every item of cost is charged to its proper account. Every dollar spent and every day's labor performed in the Elberta peaches is charged against the Elberta peaches. When they are gathered in the summer, the cost of gathering and packing, hauling and transporting is charged against them, and they are duly credited when the money received from their sale comes in. By this method the superintendent knows not only how much profit the crop yielded, but the average profit per tree. Unhealthy or unproductive trees are left out. They are on the "hospital list."

So it is with all other crops. The fig trees have an additional link in the accounting system. Their crop is sold to the big preserving plant on the farm. When the figs are gathered, the fig account is given a credit of three cents a pound. This is charged to the preserving plant account, together with the cost of sugar, steam, containers, labels, packing and labor. Then when the product is marketed, the preserving plant gets its credit.

This strict system of accounting is indispensable, if the Experiment Farm is to be of the highest value to the future farmer of pine lands. It is not enough to know that the land will produce crops. The vital thing is to know what it will produce that can be marketed at a profit and how much average

profit may be expected. It is this kind of definite practical information that will eventually transform these thousands of acres of blackened stumps and tree tops into profitable farms and orchards.

WHY THE EXPERIMENT FARM WAS NEEDED.

To know what made necessary all this work of experimenting and figuring, this planting and re-planting of the same ground with different species and varieties of fruit trees and shrubs, one must know the present day conditions as well as those who come into actual contact with them.

Over fifty years ago, the denuding of the land covered with vast pine forests began at Lake Charles when Capt. Goos' steam sawmill, the first in this section of Louisiana, began to eat its way into the yellow pine belt. For years, sawing was on such a small scale that little impression was made upon the tree-covered area. Thirty years ago, sawmills of greater capacity were put into commission, logs being floated to the pioneer mills by means of the numerous streams.

Then came the building of railroads into the pine forests, and the extension of transportation facilities. The number of mills multiplied and their capacity for sawing was greatly increased. When the Long-Bell Lumber Company began to acquire timberlands in Calcasieu and its subsidiary organizations began to erect milling plants, the pine forests were disappearing at the rate of upwards of a hundred acres a day. At the present time fifty sawmilling plants are in operation in Calcasieu parish and ninety thousand acres a year are being turned into stump land.

Roughly speaking, eighty per cent of Calcasieu's surface was originally wooded. Nearly half of the standing pine timber has been cut since the first mill was started. About 700,000 acres of its area is classed as "denuded pine land." Up to ten years ago, everybody agreed that no one could raise crops on denuded pine land. It might pasture a few sheep, they admitted, and raise a

patch of corn or cotton, here and there, but anything like making it all farm lands was out of the question. Even the millmen, the owners of the land themselves, concurred in this opinion. They would have sold their denuded lands for a song, but nobody wanted to sing. Some of them even talked of surrendering their denuded lands to the State rather than pay the few cents per acre annually demanded as taxes.

This was a gloomy outlook for the hundreds of people who came to work in the mills, hoping to find a permanent home here, and for the busy, energetic, little communities that had sprung up around these centers of activity. Luckily the Long-Bell Lumber Company never accepts say-so and theoretical evidence as final. It was not willing to admit that this land was designed by Providence to grow pine trees and nothing else. So, after its milling plants had been set to work, it sent over to Texas for T. S. Granberry, a practical horticulturist and agriculturist, who came originally from Georgia, and virtually said to him, though not in those words:

"You see before you, stretching from Bon Ami nearly to DeRidder, approximately 460 acres of land, covered with stumps and tree tops and fallen logs. People around here say that it cannot be put into shape for fruit and vegetables and other crops, and that if it could be cleared it wouldn't raise anything, anyhow. We don't believe it. Go ahead and see what you can do with it and call upon us for the money."

That was six years ago. To give some idea of what Mr. Granberry has achieved is the purpose of this article; but it may be said in advance that there has been no more talk in Calcasieu of turning denuded pine land back to the State for taxes. All the return the Long-Bell Lumber Co. has had so far from its expenditure on the Experiment farm has been the sale of its products. It has not sold any of the denuded pine land, because the company was determined first to demonstrate to its own satisfaction the agricultural value of such lands. Then it will go after in-

dustrious, practical farmers who will come here to be permanent residents.

When Mr. Granberry tackled his piece of stump land, he began in the southeast corner, just beyond the north line of houses in Bon Ami, and worked northward. His first trees were planted there in 1907. These trees are Elberta peaches, now five years old and bearing.

Each year, some new portion of the tract has been set out, but not all of it for trees or vegetables. Part of it is used for forage crops, being unsuited to the growth of fruit. Mr. Granberry has found peanuts profitable, both for forage and for enrichment of the soil. As far as practicable, the ground is kept busy all the time. If trees of a certain species or variety are set out and do not seem to thrive they are removed and a different species or variety substituted.

"I use fertilizer, generally speaking, while the trees are young," said Mr. Granberry, when the farm was recently visited, "and plant the ground between the tree rows with some sort of crop. This fertilizer helps these crops, and at the same time the trees get their share. After they are well started, the trees do not need any fertilizer. In fact, some of them never get any of any sort. For instance, these plum trees, the Japan Wonder, have never received any artificial aid."

The trees to which he referred were a mass of white blossoms, and the ground beneath them looked as though it was lightly sprinkled with snow. "This plum," he said, "is a splendid plum for shipping. It does not fall from the tree, when it is near ripe, at every breath of wind. Now those over there," he continued, "are the Gonzales plum. It has a fine flavor and is a prolific bearer, but falls easily from the limb. It takes a good, stout tug to pull a Japan Wonder from its parent stem, even when it is fully ripe. Insect enemies do not trouble it."

Between the two varieties of plums was a strip about 60 feet wide, with rows of small shoots at regular intervals. "Duncan grape fruit, budded on trifoliata," explained the superintendent. "I tried them once before, but the shoots, which came from Florida,

arrived in bad condition, and did not do well. I am going to give them another trial. That piece of ground beyond is idle now. I am going to put it in strawberries next year, and will try the effect of tile drainage on them. No, I am not an especial advocate of tile drainage, but we give everything a fair trial. That is what we are here for."

FRUIT TREES EVERYWHERE.

From Supt. Granberry's comfortable home, nearly midway between Bon Ami and DeRidder, one can get a bird's eye view of the whole farm and obtain an idea of what a transformation has been wrought in less than six years upon this one-time stretch of stumps and half decayed tree limbs. Row upon row of fruit trees, of different species and varieties stretch on either side and in front, standing as straight and regularly spaced as soldiers on parade. The fig trees are planted 15 feet apart and there are 193 trees to the acre. The peaches are 20 feet apart and run 108 to the acre.

With the peaches are planted paper shell pecan trees. Every third row north and south and every other row east and west is made up of the precious nut. When the peach trees have lived beyond the age of usefulness the pecan trees will be just coming into bearing, and the peach orchard will become a beautiful pecan grove, with the trees 30 feet apart one way, and 45 feet the other.

Among the attractions of the Experiment farm is a grove of Satsuma oranges on trifoliata stock. Approximately 250 Satsuma trees are bearing, being four to five years old, and 2,000 more are a year old. "The trees are in fine condition and came through the hard winter without injury," said Mr. Granberry. "They are free of disease and I see no reason why cut-over land will not grow oranges as well as figs and peaches." There are also a goodly array of Kiefer pears, four years old and budding out well. In fact, all the trees are so heavily laden with buds that Mr. Granberry expects a strenuous

task trimming them out when the fruit is set, so that the branches will not break.

North of the house are long rows of grapes. To be exact there are thirty rows of fifty vines each, and ten different varieties. There are three rows of each variety, planted in the order that they ripen. There are ripe grapes on the Experiment farm from June 20 to September 10. The vines, which are trained up on wire stretched on a T-shaped trellis, are four years old this year. Last year the weather was unfavorable to grapes, but the year before, when the vines were two years old, ten thousand pounds of grapes were gathered and sold.

"There is no reason why this land should not produce paying crops of grapes," said Mr. Granberry. "We have experimented with many varieties and these represent our final selections. They all resemble the muscadine type, which seems to be natural to this soil and climate. I would advise the planting of the thick skinned grape, rather than the thin skinned California varieties, which do not seem to do so well."

Just west of the grapes are long rows of fig cuttings. They number 33,000, and were all put out this spring, and, Mr. Granberry said, would begin to bear this fall.

THE PRESERVING PLANT.

The pride of the Experiment farm now is its preserving plant, where figs are prepared for the market and whence they go by the carload to Kansas City, Chicago, New York, Baltimore, Philadelphia—in fact, to every large market, although most of them are marketed by the company's own Chicago agency.

In his experiments with the fig, Mr. Granberry found no variety suitable for marketing fresh, as the fruit will not stand long-distance transportation. So he sought the fig that would best answer for preserving purposes, and finally settled on the Magnolia fig, on account of its attractive natural color as well as its bearing qualities.

The farm now has 8,000 fig trees four years old, and many others coming on.

A preserving plant was therefore a necessity, and it was constructed in the Long-Bell style. The building is commodious and comfortable. The preserving plant is equipped with six steam jacketed copper kettles, each of seventy gallons capacity. After being denuded of their stems and carefully washed, the figs are taken by a conveyor into the kettles and there boiled by steam in a 34 degree syrup made of granulated sugar for four and a half hours.

Only pure granulated sugar and water are used in the preserving process, and no bleaching or coloring matter is used. The figs, still retaining their natural color, are then put up in glass jars of four, ten and sixteen ounce capacity each, labeled. The utmost pains are taken to insure sanitary handling and the fruit is not touched by hands after it receives its preliminary bath.

The four ounce jars are put up for the railroad dining car service mostly, and are individual jars. The 10 and 16 ounce sizes are generally retailed in stores. Any fruit that becomes mashed or marred in cooking is packed and sold as second quality. Last season, an inquiry for 4,800 gallons was made for the fruit, but so much of the output was already contracted for that only 2,000 could be supplied.

"The demand for our fig is always sufficient to clean up our supply," Mr. Granberry said; "so far, we have preserved figs only, but if the peach crop is good, we may add peaches to our list this year. We would have put up some last year, but the peach crop was short and our fruit brought two dollars a crate, which is a better price than they would have brought preserved."

"Mr. Granberry, what, in your opinion, is the most profitable fruit for the ordinary grower on a small scale to raise?" he was asked.

"Figs, undoubtedly," was the reply. "Figs are practically without insect enemies; they grow with the minimum amount of care and attention and begin to bear from the first year, and the preserved fruit has a large market which can hardly be oversupplied.

"I can furnish a concrete example

of their profitable qualities. The preserving plant pays our fig orchards three cents a pound for figs and the trees pay an average profit of \$27 an acre. On this basis, the preserving plant pays for the figs and all expenses and makes an annual profit of \$1,500 to \$2,000 a year.

RUN JUST LIKE AN ORDINARY FARM.

This story would not be complete without reference to the modern farm equipment of the experiment farm. Mr. Granberry's comfortable home is flanked on each side at convenient distances with homes for the employes. There is a big packing shed, in upper part of which crates and other packing equipment is stored; a big, commodious barn for the horses and mules and their forage, besides storage room for the fertilizer, of which on an average a carload a year is used. There is a big water tank which is kept full by a gasoline engine and pumping outfit and an office for Supt. Granberry, where he keeps his records and shakes his head over such trees as refuse to earn their living. He also has telephone connection with the mill office at Bon Ami, and the messages are delivered and received over an ordinary barb wire fence.

Mr. Granberry has so much faith in the future of the cut-over lands that he is improving a fruit farm of his own, carved out of the stump land, a mile east of Bon Ami. Another strand of the same barb wire fence is reserved for a private line to his own farm.

It is also proper to state that no "fancy farming" is indulged in at the Experiment farm. Things are not raised under glass or canvas, nor watered by perforated iron pipes. Every thing is out in the open, subject to the same exigencies of wind and weather, of frost and heat, of drouth and flood that the ordinary farmer would encounter. Its purpose is to show what can be done on the land by any plain, common-sense farmer, with ordinary careful methods, and the result shows for itself. The Experiment farm is an Experiment no longer. It is an Investment.

The number of hands employed on the Experiment farm practically all the year round, averages from 12 to 14. Besides these, extra help is used in the preserving plant.

Perhaps this looks like considerable help to handle 460 acres of land, not all of which is in cultivation. It will not look so big, and it will be readily seen that none of them have much loafing time, when one considers that here are 82,716 trees on the place, trying to account to Mr. Granberry for their existence.

The big orchard is the biggest. It contains approximately 8,000 trees four years old, 7,000 trees one year old, besides 33,000 cuttings just making a start in life—all of them Magnolias.

In peaches, the Elberta easily leads, with 6,284 trees on the working list. The Belle of Georgia, an earlier peach, which finishes its year's work just when the Elberta ripens, has 1,764 members in the colony. Many other varieties were tried, but these two won out in the final contests.

The Gonzales leads the plum family with 4,000 trees and the others nowhere—that is, comparatively nowhere. The Japan Wonder is a strong probationer and the Abundance so-so.

The Satsuma orange has 246 self-supporting trees, four and five years old; 2,000 trees a year old, and 60,000 seeds to be budded; potential but not counting in the census.

The paper shell pecans will not be earning their way for some time and will be deeply in debt by the time they do; but the 2,283 trees of this kind will soon pay the debt when they get started. There are 150 Kiefer pear trees which promise well but are looked on with deep distrust because of their liability to blight; and herds of others, few in number, but many in variety, just getting a chance to prove their trustworthiness.

A new experiment in the way of disclosing the possibilities of the cut-over pine lands is being conducted by the Long-Bell Lumber Co. on a tract of 5,000 acres adjacent to Bon Ami, which have been enclosed with a hog and sheep tight fence to be used as

a cattle ranch. The advantages of the denuded pine lands for raising sheep have been amply demonstrated by the farmers of north Calcasieu, who have been raising sheep on this class of land for years with much profit to themselves. Indeed, so assured are the profits in this business, that the company has already had a chance to sell this enclosed land for a sheep ranch.

The Long-Bell Company, however, could not be induced to forego, or even delay, its cattle ranch demonstration. It desires not only to show how well adapted the cut-over lands are to stock

raising, but also to show the advantages to be gained by securing better breeds of cattle. To this end 600 head of native cattle have been placed on the ranch, together with three carloads of thoroughbred graded cattle, mostly Devonshires and Shorthorns. The cattle came through the winter in good shape and there is every prospect that the demonstration will be a success.

The company this year is planting a small acreage of forage crops, and will build three large silos on the ranch this summer to provide feed for its stock.

CATTLE TICK BURNING HURTS FORESTS

THE desire of Missouri farmers to get rid of the cattle tick has caused thousands of dollars in loss of pine-timbered sections of the State. This has been discovered by Prof. J. A. Ferguson, head of the Missouri School of Forestry.

This loss to Missouri pine forests, according to Prof. Ferguson, is due to the fires set to underbrush to kill the ticks. The fires got the ticks to a certain degree, but also got all seedlings from the pine trees which were ready to begin new forests to replace those felled by the modern timberman. In regard to this discovery, Prof. Ferguson says:

"We are studying the effect of fire on the forest, especially on the younger stand and saplings. Fires run through every year. They are set by farmers to keep down the underbrush, to kill ticks and to extend the grazing area. These fires have destroyed seedlings and have prevented the Missouri pine from reproducing.

"After the ground has been covered

with seedlings, trees have come up from the last seed crop, but these have been and will be burned up during the winter when the farmers fight the underbrush and cattle tick. Had the Missouri forests been protected from fire, pine would be growing on every hill in the pine regions. The State would be thousands of dollars wealthier in timbered lands had the protection started many years ago.

"As it is, with the cutting of the pine and the leaving no seed trees, the pine forests of the State will cease to exist, and the ground will become more than ever covered by oaks usually of little value.

"I'm teaching the boys the methods for fighting fires and the best way to keep the people from being careless with fire in the timbered sections. So far, however, I have found no traces or records of raging forest fires, but the underbrush fires have curtailed Missouri's pine forest wealth an inestimable number of dollars."

REFORESTING CUT-OVER PINELANDS

IN replying to an inquiry from S. G. Stoney, president of the Agricultural Society of South Carolina, regarding the reforestation of cut-over pine lands in that State, Assistant Forester W. R. Greeley of the Forest Service has expressed the following opinion:

"Generally speaking, after the merchantable timber has been removed from lands within the coastal pine belt of South Carolina and adjacent States, the only practicable measure to secure their reforestation is to protect the cut-over areas from fire. Under ordinary conditions such lands will restock themselves with a growth of pine if fires can be kept out. More than this is ordinarily not practicable for the owner.

"Good forestry should begin before such areas are cut. From investigations made by the Forest Service on a number of tracts in the southern pineries it appears practicable to adopt more conservative methods of cutting than are commonly practiced. The aim of this should be to restrict the trees removed to those which are mature, leaving on the ground the younger, thriftier trees which are still making a fair rate of growth. Ordinarily this would mean probably the leaving of a quarter or a third of the merchantable stand per acre which is usually removed. The trees so left would of course be those of the smaller size and particularly of shorter clear length and containing the most limbs and knots. Obviously they are the trees which yield inferior grades of lumber. By leaving such trees standing and restricting the cut to the older growth which contains the best quality of lumber, it is my judgment that operators would often find the results beneficial from a business and manufacturing standpoint. The trees so left would insure a thorough restocking of the ground which, together with the exclusion of fires, would result in complete restocking of the land.

"If you have any considerable acreage still uncut I suggest that you consider the practicability of adopting measures of this character. Unfortunately the Forest Service is no longer able, on account of the demands of its other work, to make examinations of extensive private holdings and give the owners specific advice on their management. I enclose, however, a list of consulting foresters who are prepared to do just such work and to give the owner or operator specific recommendations on how his land should be managed with reference both to practical lumbering operations and insuring a second growth of timber.

"For the lands which you have previously cut over, however, I have just one suggestion, namely, that fires be rigidly excluded. The custom prevalent in many parts of the South of burning over pine lands annually to secure a heavier growth of forage is usually fatal to any forest reproduction. Such fires do not kill the larger trees and often may not seriously injure saplings 15 inches in diameter or upwards. They inevitably, however, prevent the starting of seedlings and hence keep the land from producing nearly as dense a growth of timber as it naturally would if fires can be eliminated.

"Aside from protection from fire, the only possible step would be reforestation by artificial methods. This is practicable as a matter of investment in certain localities, but not everywhere. The Forest Service hesitates to recommend it as a general practice because the market values of timber are not yet in the main sufficiently high to meet the cost of planting and caring for the young trees until they reach merchantable size. Our investigations have shown that in the case of loblolly pine, which makes exceptionally rapid growth, a good merchantable crop paying reasonably fair returns upon the investment may be secured in 40 years. With long-

leaf and shortleaf pines, however, having slower growth, planting from a commercial standpoint is hardly yet feasible. The Forest Service is now experimenting with the possibility of introducing maritime pine, the naval stores pine of the Mediterranean coun-

tries, which makes rapid growth and produces an excellent quality of rosin and turpentine, on cut-over pine lands in the Southeast. This work, however, is still in an experimental stage and its possibilities are not yet fully known."

LUMBERING IN RUSSIA

BY CONSUL W. F. DOTY, RIGA

LUMBERING is one of the principal industries of the Riga consular district and provides employment in the forests through the winter months for a large proportion of the agricultural population of these provinces.

The region from which the lumber is obtained comprises a forest area of 53,473,732 acres, situated in 14 Provinces and yielding timber for the most part of medium-sized red and white pine. Other varieties available but of less importance to the trade are birch, alder, and aspen. Of these forests 9,374,310 acres are State owned, 36,891,245 acres are manorial woods, 2,730,113 acres are Crown lands, and the remaining 4,478,064 acres are peasant and other tracts.

The value of forest lands in this district depends upon several conditions, the two main being locality and the amount of timber obtainable for export purposes. An average price per acre can not be given, as in addition to the timber suitable for the export trade, which mainly influences the price, there is often a considerable quantity of inferior stuff available for local consumption in the shape of firewood, shingles, etc. For a forest lying near the River Dvina the value per dessiatine may range from 100 rubles for ordinary growth to 300 rubles for special growth (\$19.07 to \$57.22 per acre).

Timber is usually sold in this district either in tracts for a stated sum, or at prices varying with the dimensions of the logs. The logs coming to Riga

range from 7 to 9 inches at top; the bulk are 8 and 7 inches, the quantity over 9 inches thick being very small.

Felling the trees and hauling the logs to the railroad or nearest stream is for the most part possible only during the season of snow roads in winter, and is either undertaken by the purchaser, usually a lumber dealer, or the seller agrees to deliver the logs to the contracted spot, whereby it often happens that a mild winter or the absence of snow roads makes it impossible to haul out the logs from the forest and penalties for breach of contract are incurred.

The prices paid for felling and hauling vary according to the price of labor current in the district and the distance to be hauled. An estimate of the cost of bringing to Riga an average log of 28 feet length, diameter at butt end 11 inches, at top 8 inches, from a forest in the Province of Vitepsk lying 10 miles from the river Dvina, gives, per fathom of 7 feet: Felling and hauling, 15 kopecks; making roads in forest, 3 kopecks; tying into rafts, 3 kopecks; rafting to Riga, 15 kopecks; making a total of 36 kopecks, or 18½ cents.

The cost of sawing at the railroad is stated to be \$5.15 per standard of 165 cubic feet; cartage at station, \$1.03 per standard; average railroad freight to Riga, \$5.15 per standard. The total expenses—sawing, lighterage, etc.—incurred at Riga to convert logs which have been rafted down the river into lumber for export would amount to \$9.27 per standard. Sawmill charges at Riga are \$6.70 per standard.

LARGE SALE OF TIMBER

CHIEF FORESTER GRAVES went to San Francisco in September to make final arrangements under which a California lumber company will purchase 800 million feet of timber on the Sierra National Forest. The timber has already been awarded, after public advertisement, to the highest bidder, but under the terms of the advertisement the final signing of the contract will not take place until the company has been shown on the ground what timber the Government will regard forest conditions and provide for serve from cutting in order to preserve reproduction.

The company will be allowed its full 800 million feet, but naturally it will not be allowed to cut clean. As a rule the Forest Service reserves something like one-third of the forest stand in applying forestry on Government holdings. A marking board made up of one man sent from Washington, one from the District office in San Francisco, and the local Forest Supervisor will carefully mark a sample area, to show how the restrictions on cutting will be applied. Representatives of the company will then go over this area, after which Chief Forester Graves and his assistants will, it is expected, make final arrangements with the company in San Francisco, and the contract of sale will be signed.

"The Forest Service," said Mr. Graves in speaking of this sale, "has received a number of inquiries whether in selling so much timber to a single purchaser the Government may not be opening the way to a monopolistic control of local lumber markets. Other correspondents are disturbed lest the sale prove a bad bargain for the Government through the rise in value of the timber in the twenty-two years during which the company will cut.

"Such large and long-time sales of National Forest timber as that to the California company are a new development in the Forest Service. Great bodies

of mature but inaccessible timber can be put on the market only if sale contracts are let on terms which will justify a very heavy initial investment in transportation facilities. In entering into such contracts, however, special safeguards to protect the public against monopoly and to prevent an undue speculative profit to the purchaser are employed.

"The National Forests contain, in all, the equivalent of nearly 600 billion feet of timber now of merchantable size, besides young growth for future harvest. Because of its remoteness from market and the wild, mountainous country, without transportation facilities, in which most of it lies, only a small percentage can now be sold on any terms. Most of it would cost more to get it out than it would bring. The sale of less than one-fifth of one per cent of our total supply to one company leaves plenty of room for competition by other companies.

"The timber which has been sold to the California company lies well back in the Sierra Nevada Mountains and will require the construction of 70 miles of standard-gauge railroad to open up the area. Since this road will also open up other National Forest timber and will be a common carrier, it creates another safeguard against monopoly. The company is given a cutting period of twenty-two years to remove the timber, besides an additional two years for the construction of logging and manufacturing facilities. The sale was publicly advertised for six months in order to give an opportunity for all who wished to compete for the contract to make bids, as is done in all large National Forest sales.

"No business organization would undertake the heavy investment necessary in such cases unless the handling of a large body of timber and a sufficient period in which to remove it under practical logging conditions are assured. The great difficulty in making such

long-term sales is to establish a price which will be fair to both sides. No one can foresee future conditions well enough to know what stumpage will be worth ten, fifteen, or twenty years hence.

"Consequently the terms of sale provide for the readjustment of stumpage prices every five years. The basis for fixing the prices will be, in each case, the prices of manufactured lumber in the markets where the timber is sold during the preceding two years.

"For several years the Forest Service has been selling in the neighborhood of a million dollars' worth of National Forest stumpage per year, but this combined with what is cut for free use is

only about one-eighth of what might be cut without reducing the permanent stock of the Forests. The supply will be kept up through growth. By making long-term sales it will be possible greatly to increase the amount available for present needs of the timber consuming public, without endangering future supplies through overcutting. It will always remain true, however, that vastly the greater part of our timber sales will be to small purchasers, who are favored wherever possible. Monopoly is impossible as long as the door is kept open for such purchasers. Out of over 5,600 sales made in the fiscal year 1911, about forty were for over \$5,000 worth of timber to a single purchaser."

RESTORING ELK TO THE FORESTS

RESTORATION to the forests of the Rocky mountain region of at least a portion of the great herds of elk which formerly roamed the mountain sides all the way from northern Canada to the Mexican line, is a project which the biological survey of the Department of Agriculture in conjunction with the United States Forest Service has taken up.

Contrary to the accepted belief that the elk of the United States suffered decimation and practical extinction through slaughter by hunters, white and red, the Forest Service explains that starvation occasioned by the consumption of the herbage by the cattle, and, more particularly, by the sheep on the ranges, has been the chief cause of the dying out of the elk.

In Yellowstone Park, however, there have been all along several fine herds of elk; also in the regions of Wyoming surrounding Jackson Hole there is a superb herd.

In the summer of 1911 Supervisor Knowles obtained a shipment of elk for the Sun Dance National Forest. The Wichita Forester, in western Oklaho-

ma, besought the Washington chiefs of the allied services for a small herd. Eight were sent him in 1909, and the Wichita herd now numbers twelve.

It is the present intention of the biological survey to fill out each and every request of the forest supervisors wherever favorable opportunity offers. So long as the slender money supply available lasts these transfers of elk from their present habitat to the newer sections of the distant west will be effected.

The transportation of the elk is an interesting as well as an exciting process. The younger elk, that is, bucks and does, ranging in age from seven to eight months up to two years, are tempted into fixed corrals and trapped. After the trapping they are roped and tied. In the instance of the recent transfer from the Yellowstone region to the Sun Dance forest reserve, the journey was made for a considerable portion of the way by sleds. The animals, in separate frame cages, were laced on the sleds and drawn by sturdy mules mile after mile across the hills and prairies to the railway.

The favored time for moving the elk is in the early spring. By that time the animals born the preceding spring are stout and strong enough to withstand transportation. In the first effort at transplanting elk, twenty-six animals made the journey. Four died from injuries received in the ninety-mile sled haul from Jackson's Hole to St. Anthony, Idaho, where the transshipment to the railway was effected. One female died a few months later from unhealed fractured ribs, evidently suffered on the railway journey. At Sun Dance the other twenty-one elk are now strong and hardy.

The transference of the elk from the more northern latitudes to the less

rigorous climates of western Oklahoma, Arizona and New Mexico, it is believed by the biological experts, will result in the rapid propagation of this valuable and desirable game animal. The elk is not subject to disease and after the fourth year the female usually bears twin elk calves annually.

It is the belief of the biological survey that the elk population of the United States will, through the means now taken to develop herds in many sections of the Rocky mountain region, double within the next three years. Within a decade it is the belief of Chief Palmer, of the bureau, that an approximate restoration of the indigenous herds will be brought about.

FIRE LOSSES IN WASHINGTON

THE Washington Forest Fire Association, of which George S. Long is president and J. L. Bridge chief fire warden, have sent out through their secretary, O. Bystrom, a statement to members from which the following are taken:

No damage was done in Washington to timber until about the middle of May, when three very hot days came and fires swept over logged-off areas, doing considerable damage to logging equipments and in some instances to green timber. Heretofore May has been regarded as a safe month, so much so that the State law does not include it in the dry and dangerous season, which

begins June 1. There have been no fires on account of the wet summer since May.

Instructions were issued to rangers to keep a lookout for trespassers and report any breach of the law promptly to the office. Several reports of that kind were received, and the owner upon whose land the fire occurred was notified.

The Washington Forest Fire Association, as generally known, is a private one. It is made up of timber owners throughout the State. This year the total assessments were only 1 3-4 cents per acre, somewhat less than former years.

SOME OHIO STATISTICS.

Ohio had 1,390 factories assigned to the lumber and timber division. The average number of employes was 13,456. The value of the products was \$34,597,000. The greatest number of employes in any one section were those engaged in foundry and machine shops, amounting to 64,817. There has been little change in the value of the lumber output in ten years. Sawmilling has declined, but the output of planing mills and boxes has increased. There were 411 independent planing mills.

He set September 16 for the white pine blister rust hearing, September 19 for the fruit fly hearing, and September 20 for the potato wart disease hearing.

A Moving Forest in Wales

A strange story of a moving wood near Llandaff was told at a meeting of the district council by one of the members (Mr. William Hopkins), says the *London Chronicle*.

The wood, he said, was situated on a steep slope and was gradually moving toward the road at the foot. The wood is quite 400 yards long, and consists of stately elm trees. It had "left its moorings," he said, and was moving bodily toward the Llanvithyn road. A cut had been left at the top, which was full of water.

Some of the trees were coming down bodily, while others were leaning in all directions. The wood had been moving now eight or nine days, and it was some little distance from the road, but was in danger of coming on to it.

Studying Lumbering Industry

E. P. Secker, the special agent of the Commerce and Labor Department who is investigating the lumber trade abroad, may make a trip around the world, touching at all important countries, in pursuit of his duty. Mr. Secker is now in England. He has been abroad since spring. He is expected at present to study lumber trade conditions throughout Europe, see what the market there demands in the way of lumber, etc., and find openings for the American lumber exporter. If his work comes up to the hopes of the Department and of the trade, Mr. Secker is expected to be ordered to extend his work beyond Europe into other continents and the islands of the sea. In that event he will be absent from this country for a year or more longer.

Forest Reserve Transfer

The Forest Service has begun the work of closing up the purchases of land made under the provisions of the Weeks law for the formation of the Appalachian forest reserve. The first deed to be filed was at Marion, N. C., for 8,113 acres. The Government has options on about 16,000 acres immediately adjoining this property. Although the Weeks law became effective March 1, 1911, so much preliminary work was required that the actual transfers are only now beginning.

Wood Distillation

The United States Forest Service has recently issued an interesting bulletin on the distillation of resinous wood by saturated steam. The bulletin was prepared by L. F. Hawley, chemist in forest products, and R. C. Palmer, assistant chemical engineer in forest products, and describes a series of experiments along this line carried on at the forest products laboratory.

The experiments were undertaken by the Forest Service because there has been no uniformity in the commercial distillation of pine, and no definite ideas among operators as to the proper steam pressure, size of chips or rapidity of distillation, and little or no data has been heretofore published regarding the differing results from changes in these readily controlled variables.

Lightning Hits All Trees

The Department of Agriculture has made public the results of an exhaustive investigation of lightning strokes throughout the country. The report disposes of the belief of the ancient philosophers that certain kinds of trees—the laurel, aspen and beech—were never struck by lightning with the statement that "any kind of tree is likely to be struck."

The report shows that lightning strikes in the Colorado plateau region more often than anywhere else in the country, and asserts that lightning is a prolific source of fires in the forests of the West.

ILLINOIS LUMBER PLANTS.

In Illinois there were 814 plants at work in lumber and timber, employing an average of 16,567 people. The output was valued at \$44,952,000. The number of men employed in foundry and machine shops were 52,266; the next largest number being in manufacturing men's clothing and shirts, to-wit, 36,152. The great value added to forest products in that State came from planing mills and other woodworking plants, even though over one-half of the establishments were sawmills. The increase in the value of lumber products reported in the State has been very great in the former five years.

STATE NEWS

New Jersey

Much valuable information concerning the planting and care of shade trees and the prevention of diseases which are fatal to them is contained in a handsome volume just issued by the Forest Park Reservation Commission of New Jersey and entitled the "Planting and Care of Shade Trees." The book contains 128 pages, is handsomely illustrated, several of the illustrations being fine colored plates of injurious tree insects; and several charts which graphically depict methods of caring for diseased trees, that they may be made healthy again. The illustrations in the volume are well chosen to give instructions as to how trees should be planted to give the best effect, particularly in cities.

The volume is for general distribution among people who are interested in shade tree culture and in the prevention or the cure of diseases in shade trees, and a copy may be obtained by addressing Alfred Gaskill, State Forester, at the State House at Trenton. The book is made up of an article on "The Planting and Care of Shade Trees," by the late Dr. John B. Smith, State entomologist, who died March 12, 1912, and another paper on "Diseases of Shade and Forest Trees," by Mel. T. Cook, State plant pathologist. The cost of issuing the book was borne by Charles LaThrop Pack, of Lakewood, a member of the Forest Park Reservation Commission.

Texas.

I. M. Johnson, of Houston, until recently special agent of the State Department of Agriculture, was in Dallas recently and perfected arrangements for tackling the diseased trees of Dallas.

It is the intention of Mr. Johnson to spend a week out of each month in Dallas, giving his personal attention in overseeing the work, which will be under the supervision of a graduate of the School of Forestry, University of Michigan, who also has had three years' experience in the Forestry Service, Department of Agriculture, Washington, D. C. This party, Z. T. Bliss, at present is superintendent of the tree work in Houston which is being done by Mr. Johnson.

Massachusetts.

The report of the State Forester's office that losses this year in Massachusetts amounted to only \$50,000 up to August 1 is gratifying to those who are responsible for

the establishment of observation stations on high points throughout the State. Seventeen of these lookouts are now maintained, and the justification of the system is the fact that this year's losses are about \$500,000 less than the losses during a corresponding period last year.

There is still a long period of the fall season when forest fires will be a menace. But it seems likely that this year may establish a new low record of losses.

New York

An agreement has been made between the State Conservation Commission and the Adirondack League to experiment in forestry on the 140,000 acres of forest lands owned by the league at Little Moose, Herkimer county, according to Governor Dix. It is proposed to permit the lumbering of the league's tract by cutting matured trees and planting at least one tree for every tree taken.

The Governor, who recently addressed the league in favor of this plan, said that systematic lumbering would in no way injure the forests or interfere with wild game.

The league is composed of wealthy citizens, who, heretofore, have always opposed the extensive cutting of lumber in the Adirondack forests.

Minnesota

The need of a city tree warden in St. Paul is acute, according to State Forester Cox, who declared recently that he approved highly the move of the Women's Civic League toward getting such an official for this city. The number of complaints and questions that come to the office of the State Forester from women and householders, who ask for advice as to how to care for their trees, and which his office is unable to care for, indicates that the appointment of a city forester would answer a crying need, Mr. Cox said.

Wisconsin

By a purchase consummated a few days ago the State of Wisconsin added 20,000 acres of land to its forest reserve, the timber tract acquired being located in Oneida and Vilas counties. It was bought from the

Land, Log and Lumber Company, of Milwaukee. The State has been negotiating for these lands for over a year. They were cut over about twenty years ago, and the area comprises nearly two townships. Another large deal will be made soon, when the H. W. Wright Lumber Company, of Merrill, will transfer 16,000 acres of cutover land to the State. In addition to these two large purchases, the State forest reserve has been increased by the acquirement of 500 acres comprising 250 small islands donated by Congress and located in inland waters in the northern part of the State, giving the State a complete forest reserve of about 400,000 acres, not including the lands held by the State for sale to be used for agricultural purposes.

Louisiana.

Reports from the overflow section of Louisiana and Mississippi indicate much damage to logs and down timber by a black beetle that has flourished unusually well since the overflow set in. The beetle is a borer which goes through the wood as if it was dust.

A number of lumber companies operating in overflowed sections have called off their men in the woods until all logs on hand have been put through the mills. Several concerns, especially in Northeast Louisiana, report that the beetle has caused them thousands of dollars of damage. The damage is greater in some sections than others, seemingly depending upon present ground conditions.

CURRENT LITERATURE

MONTHLY LIST FOR SEPT., 1912.

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Chapman, Herman H. *Forestry; an elementary treatise*. 79 p. Chicago, American lumberman, 1912.

Holmes, J. S. *A forester's notes from Europe; Germany*. 4 p. Chapel Hill, N. C., 1912. (N. C.—Geological and economic survey. Press bulletin 87.)

Mumford, George D. *The world's timber problem, with some conclusions*. 56 p. N. Y., 1912.

Proceedings and reports of Associations, Forest Offices, etc.

Canadian forestry association. *Report of the thirteenth annual convention and meeting held at Ottawa, Feb. 7th and 8th, 1912*. 123 p. Ottawa, 1912.

India—Bombay presidency—Forest dept. *Administration report of the forest circles including Sind, for the year 1910-1911*. 176 p. Bombay, India, 1912.

India—Burma—Forest dept. *Reports on the forest administration in Burma for the year 1910-11*. 206 p. Rangoon, India, 1912.

India—Central provinces—Forest dept. *Report on the forest administration of the Central provinces for the year 1910-11*. 150 p. Nagpur, India, 1912.

India—Coorg—Forest dept. *Progress report*

of forest administration for 1910-1911. 23 p. Bangalore, India, 1912.

Minnesota—State forester. *First annual report, 1911*. 16 p. il., map. Duluth, Minn., 1912.

Forest Education

Arbor Day.

Oregon—Dept. of public instruction. *Oregon arbor and bird day manual*. 32 p. il. Salem, Ore., 1912.

Forest schools

New York state college of forestry, Syracuse university. *Announcement of ranger school*. 16 p. Syracuse, N. Y., 1912.

University of Idaho—Dept. of forestry. *Announcements concerning the courses to be offered in forestry, 1912-1913*. 16 p. Moscow, Idaho, 1912.

Forest Description

Cameron, D. Roy. *Report on timber conditions around Lesser Slave lake*. 54 p. il., map. Ottawa, 1912. (Canada—Dept. of the interior—Forestry branch. Bulletin 29.)

Forest Botany

Trees, classification and description

Maiden, J. H. *The forest flora of New South Wales*, pt. 48. 12 p. pl. Sydney, N. S. W., Gov't printer, 1912.

Woods, classification and structure

Record, Samuel J. *Identification of the economic woods of the United States, including a discussion of the structural*

and physical properties of wood. 117 p. il., pl. N. Y., J. Wiley & Sons, 1912.

Silvics

Forest influences

ckardt, Wilhelm R. Der einfluss des waldes auf das klima. 8 p. Karlsruhe, G. Braun, 1909.

Forest Economics

Statistics

aden—Forstverwaltung. Statistische nachweisungen für das jahr 1912; jahrgang 33. 172 p. Karlsruhe, 1912.

acmillan, H. R. Forest products of Canada, 1910. 133 p. Ottawa, 1912. (Canada—Dept. of the interior—Forestry branch. Bulletin 28.)

Forest Utilization

Wood distillation

awley, L. F. & Palmer, R. C. Distillation of resinous wood by saturated steam. 31 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 109.)

Auxiliary Subjects

Hydrology

aine—State water storage commission. 2d annual report, 1911. 267 p. maps, diagrs. Waterville, 1912.

nited States—Dept. of the interior. Geysers, by Walter Harvey Weed. 29 p. il., maps. Wash., D. C., 1912.

nited States—Dept. of the interior. Some lakes of Glacier national park, by Morton J. Elrod. 29 p. il., maps. Wash., D. C., 1912.

Geology

nited States—Dept. of the interior. Geological history of Crater lake, Oregon, by J. S. Diller. 31 p. il., map. Wash., D. C., 1912.

nited States—Dept. of the interior. Geological history of the Yellowstone national park, by Arnold Hague. 23 p. il., maps. Wash., D. C., 1912.

Periodical Articles

Miscellaneous periodicals

ulletin of the American geographical society, Aug. 1912.—A geographic study of the Mesa Verde, by Wallace W. Atwood, p. 593-8.

Cornell rural school leaflet, Sept. 1912.—Tree study, by John Bentley, p. 153-65.

Country gentleman, July 6, 1912.—The farm woodlot; a neglected asset, by Ernest A. Sterling, p. 7, 28.

Missionary review of the world, July 1912.—Call of the lumber jack, by Chas. A. Bowen, p. 513-9.

Outlook, July 27, 1912.—Kiote, by Theodore Shoemaker, p. 679-83.

Overland monthly, June 1912.—What is forestry, by A. L. Dahl, p. 571-9.

Philippine agricultural review, Aug. 1912.—Philippine kapok; a promising new industry, by M. M. Saleeby, p. 432-7.

Scientific American supplement, July 20, 1912.—Xylogy, a new branch of science; identifying different woods and detecting fraudulent substitutes, p. 44.

Torreya, Sept. 1912.—The determination of woods, by Chester Arthur Darling. p. 201-8.

Trade journals and consular reports

Engineering news, June 27, 1912.—Proving that forests benefit navigation, p. 1239.

Furniture journal, Aug. 26, 1912.—Methods of finishing hardwoods, by C. J. La Valles, p. 56-8.

Hardwood record, Aug. 25, 1912.—The national Appalachian park, by Henry H. Gibson, p. 25-36. The true mora of British Guiana, p. 42.

Lumber world review, Aug. 25, 1912.—Forest legislation and forest work in British Columbia, by W. R. Ross, p. 20-1.

Lumber world review, Sept. 10, 1912.—A model forest school at home and abroad; travels of the Biltmore students, p. 17.

Pacific lumber trade journal, Aug. 1912.—People of Idaho are told of their forest responsibility, by E. T. Allen, p. 46.

Paper, Aug. 28, 1912.—Bamboo as a source of paper pulp, p. 15-18, 42.

Paper trade journal, Aug. 22, 1912.—The spruce bud moth, by Chas. D. Woods, p. 56.

St. Louis lumberman, Aug. 15, 1912.—Amuguis, by H. N. Whitford, p. 30; Missouri forestry students in the Ozarks, p. 63.

Southern industrial and lumber review, Aug. 1912.—Logging engineering as taught at the University of Washington, by E. T. Clark, p. 45, 64; Commercial creosotes and wood decay preventions, p. 80-1.

Timber trade journal, Aug. 10, 1912.—Burrs, p. 192; Dry rot, or the dissolution of wood by vegetable agency, p. 193.

Timber trade journal, Aug. 17, 1912.—The mahogany trade of Central America, p. 223; Dry rot, or the mechanical dissolution of wood, p. 227.

Timber trade journal, Aug. 24, 1912.—Australian timbers; opportunities for trade, by S. de Malraison, p. 260; Forestry education at Aberdeen, p. 289.

Timber trade journal, Aug. 31, 1912.—A new timber drying process, p. 297-8.

Timberman, Aug. 1912.—Log flumes are of economic value where conditions are favorable, by W. D. Starbird, p. 42-4; Logging by rail in Montana, by Kenneth Ross, p. 62; Practical aerial snubbing

- device for lowering logs from high ground, by R. R. Nestos, p. 49-50; New and successful utilization of compressed air for snubbing machines, by Henry A. Kalb, p. 53-4; Burning slash is a question of increasing importance to loggers, by E. T. Allen, p. 59-60; Burning slash, by F. E. Ames, p. 61-2.
- United States daily consular report, Aug. 20, 1912.—Lumber and timber products abroad; England, by Augustus E. Ingram, p. 897-8; Lumber and timber products abroad; Russia, by W. F. Doty, p. 899-900; Lumber and timber products abroad; Martinique, by Thomas R. Wallace, p. 900-1; Lumber and timber products abroad; Formosa, by Samuel C. Reat, p. 901-3; Lumber and timber products abroad; China, by Samuel S. Knabenshue, p. 903; Importations of mahogany into Canada, by Felix S. S. Johnson, p. 908.
- Wood craft, Sept. 1912.—Overmantels; their design and construction, by John Bovingdon, p. 169-72.
- Forest journals*
- Bulletin de la Société centrale forestière de Belgique, Aug. 1912.—Expériences sur l'emploi des engrais, p. 460-5; Expériences en pépinière, p. 465-9; Les forêts roumaines, by N. I. Crahay, p. 469-75; Sur une théorie nouvelle de la captation de l'azote atmosphérique par les plantes, by E. Henry, p. 475-83.
- Centralblatt für das gesamte forstwesen, July 1912.—Ueber die gattung polygraphus, by Walther Sedlacek, p. 305-10; Zur forstlichen rentabilitätslehre, by Theodor Glaser, p. 310-21; Neuere bestrebungen auf dem gebiete der holz-konservierung, by E. F. Petritsch, p. 321-33.
- Forstwissenschaftliches centralblatt, June 1912.—Begründung der mischbestände von fichten und buchen, sowie von kiefern und buchen, by Tiemann, p. 297-309; Eine forstliche ausstellung in Amerika, by F. Harrer, p. 309-19; Ueber trüffeln und trüffelnzucht, by Vill, p. 320-8.
- Forstwissenschaftliches centralblatt, Aug. 1912.—Das gesetz des inhalts der baumstämme und sein bedeutung für die massen- und sortimentstafeln, by M. Tkachenko, p. 397-419; Italiens neueste forstpolitik, p. 434-6.
- Hawaiian forester and argiculturist, July 1912.—Notes on forest insects, by R. C. L. Perkins, p. 202-9.
- Indian forester, Aug. 1912.—Pyinmana forest division; teak and bamboos in Burma, by F. A. Leete, p. 355-80; Possibility of growing cork in India, p. 422-4.
- Revue des eaux et forêts, June 15, 1912.—Question d'aménagement, by L. Pardé, p. 353-5.
- Revue des eaux et forêts, July 1, 1912.—Vieux taillis, vieilles souches, by L. Pardé, p. 391-4; Le budget des forêts en Norvège, by H. Perrin, p. 397-402.
- Revue des eaux et forêts, July 15, 1912.—La coupe a blanc étoc dans les forêts résineuses, by C. Delahaye, p. 417-21; Contre le déboisement; menace de déforestation en Indochine, by Verdaguer, p. 421-6; Les exploitations forestières dans la province de Québec, by Coulon, p. 426-31.
- Revue des eaux et forêts, Aug. 1, 1912.—Possibilité par volume de futaies jardinées, by L. Duhar, p. 449-59; De l'influence de la lumière sur la qualité du bois de chêne, by P. Galland, p. 459-64.
- Zeitschrift für forst- und jagdwesen, July 1912.—Forstwirtschaftliche rückblicke auf das jahr 1910, by Semper, p. 399-425; Zur nonnenbekämpfung, by Spletts-toesser, p. 434-9; Zusammenlegung von niederwald, by von Salis, p. 439-53.
- Zeitschrift für forst- und jagdwesen, Aug. 1912.—Waldbauliche sünden, by Frey, p. 463-8; Die organisation der preussischen forstbehörden, by Lehnpuhl, p. 468-81.

JAPS SUPPLY THE CHINESE.

The lumber for packing cases, etc., used by the Chinese comes chiefly from the Yalu River region, and the trade in this lumber is entirely in Japanese hands. The importation is in the form of squared logs, which are purchased by Chinese carpenters and sawed up into boards by hand. Attempts have been made to introduce sawmills for this work, but the price of labor is so low here that it is cheaper to cut boards by hand than by steam.

MASSACHUSETTS' SHOWING.

In the State of Massachusetts, under the head of lumber and timber produce, 708 establishments are listed, employing on an average of 8,967. The value of the output was \$23,-026,000. Lumbering in that State is a very insignificant factor when compared with the manufacture of cotton goods, which employs 108,914 people. The boot and shoe makers employ 83,063. The value of the output of the latter exceeds that of any other line of manufacture. In Massachusetts the number of independent planing mills was 208, with 391 sawmills and 109 packing box factories. There were cut in that State 361,200,000 feet of lumber.

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FORESTRY AND FOREST RESOURCES IN NEW YORK*

By STATE FORESTER F. A. GAYLORD

IN New York State, forests cover about 7,500,000 acres. With the farm wood lots the forested area is brought up to 12,000,000 acres. In all the 12,000,000 acres it can safely be said that there are not 1,000 acres that are producing more than half the wood material which they could under proper management. There are 300,000 acres of virgin forests, where growth is offset by decay. There are 400,000 acres of barren land producing nothing. There are about 5,000,000 acres cut and burned over which are partially restocking, the remaining area being in a more satisfactory condition as far as irregular natural production is concerned.

Here in New York, where we are very far away from the great present sources of timber, we are only too ready to believe that these areas will supply us indefinitely. This is far from being the truth. To bring this out more clearly, let us take an example from the eastern States.

With the exception of comparatively small areas in the Lake States, the white pine of the East has been entirely cut. This is well brought home to us by the fact that in 1850 Albany was the most important timber market in the United States, while today she has practically no influence whatever on the lumber trade of the country. In that year New York ranked first in timber production, today she ranks nineteenth, and she nowhere near begins to cut the timber that she uses. As another example of the rise and decline of a State in timber production, in 1880 Michigan supplied 25 per cent of the timber of the United States. In 1907 she supplied 4.05 per

cent. If this is true of New York and Michigan, why will it not be true of other States, especially if we bear in mind that now we have a national population of 95,000,000 people and fifty years hence this will have grown to 200,000,000.

At present we have in New York State about 6,000,000 acres of forested lands, which has saw timber on it; 300,000 of this is virgin and the rest has been cut over more or less severely, so that the average stand is about 4,000 board feet per acre, giving a total stand of saw timber of about 25,000,000,000 board feet. Aside from this amount there are about 30,000,000 cords of wood occurring on the remaining forest area, and as waste from logging operations.

The forests of our State in their present condition are not producing more than 25 board feet per acre per year. This, for 12,000,000 acres, gives 300,000,000 board feet per year. The lumber statistics of the State show that we are cutting over 1,000,000,000 board feet annually. This figure does not take into consideration the immense amount of cord wood needed to supply the demands of the population of 10,000,000 people. Taking this into consideration, we are cutting our woodlands at least five times as fast as they grow, and at the same time we are importing vast quantities from other States. We get much construction timber from the South, carriage woods from the Mississippi valley and the South, shingles from the West, pulp from Canada, etc. How long will this state of affairs continue, as there is hardly a State in the

Union where cutting is not being carried on in excess of the growth.

We can triple the growth of our forests by means of proper management. We can reduce wastes to a very great extent. We can do away very largely with forest fires. While we are accomplishing this, our population is increasing by leaps and bounds and not only increasing the demand, but taking up land where we now grow timber.

Every minute lost in taking the proper care of our forests will be dearly paid for in the future.

In New York there are 400,000 acres absolutely denuded of valuable forest growth. This area will have to be replanted at an expense of three or four million dollars if we are to re-establish a profitable forest cover. There are several million acres which at the present time are only partially covered with valuable species. Here as much more money will have to be spent if the maximum yield of our forests is to be obtained.

A great deal of our forested area is in a most inferior condition. It has largely been cut over and even where the cover is complete the trees left are of inferior species or in a dead or dying condition, and they are acting as a great hindrance to the proper growth of the young and more valuable trees.

The density of the forest then has been utterly destroyed in part and very much lessened on a large portion of its area. This has resulted in the total or partial destruction of the forest floor; that is, the humus or vegetable mould has been burned up, either by fire or by the sun. Where the cover has entirely disappeared erosion sets in, as there is nothing left in the soil to bind it together. It slowly works down the slopes of the hills and mountains to eventually choke our rivers and harbors or be spread out over our fertile valley farms and cause total destruction.

There has been enacted in this State considerable forest fire legislation. In the first place it has been attempted to do away with the material which causes the worst of forest fires, that is the slash left by the lumbermen. Slash is

of two kinds, hardwood and softwood slash. The hardwood slash disappears much more quickly than the softwood, and this has not been covered by legislation. The question has been with the softwood or evergreen tree tops.

Under ordinary conditions the top left after the logs are cut is held up off the ground by the lower branches and during the fire season becomes dry as tinder and constitutes a serious fire danger for from fifteen to twenty years. Since 1909 loggers have been compelled by law to lop or cut off the limbs from all tops so that the refuse will all lie close to the ground. This was done in order to do away with the fire danger as soon as possible, as the top will disappear through decay much sooner if all branches are lying on the ground than if they are held up in the air. The reasons for this are that the fungus causing decay requires air and moisture for the proper carrying on of its work. The top when it is held up from the ground has plenty of air, but moisture at the proper time of year is lacking. On the other hand, wood completely submerged in water does not decay, as the air is lacking. The conditions most favorable for the growth of rot exists at the surface of the ground and if all branches lie as close to the ground as possible, they will disappear in the minimum time. The best proof that this is so lies in the fact that our fence posts, telegraph and telephone poles, etc., have by far the greatest amount of decay at the point where they enter the ground. The least observing person knows that this is true, and it is well brought out by the fact that if any single part of a pole is to be treated with preservative, it is this point, and many companies imbed their poles in concrete for a foot or so at the surface of the ground. There cannot be the slightest doubt then that the tops will decay more quickly lopped than unlopped.

In cases where tops have been lopped, the slash has disappeared, as a fire danger, in six to seven years. So far so good.

Let us first consider the management of our spruce lands. These areas can

THE ADIRONDACK FOREST.





A VIRGIN STAND OF TIMBER.



REPRODUCTION UNDER MATURK TIMBER.

be roughly divided into spruce slopes, spruce flats, and spruce swamps.

The management of our spruce slopes, particularly the high slopes, is a difficult proposition. The timber on such a location is usually quite uniform but smaller in diameter and shorter and is much more liable to be wind thrown than the spruce on the lower situations. The use of a diameter limit under such conditions does not bring good results as a rule. Practically all the trees that are left below the limit set, provided we take out enough to make the operation profitable, are wind thrown and such trees, of course, had better be taken out during the lumbering operations.

The best method to use would probably be some sort of a clear cutting operation by strips or groups. Seed trees might be left as groups of trees covering perhaps a tenth of an acre and thus would give mutual protection against the wind. A system of clear cutting by strips might work out very well under these conditions, cutting say a strip about 100 to 150 feet wide and leaving a strip of equal width to be taken out at a second operation after reproduction is established on the cut-over strip. In any method of leaving trees for the distribution of seed, it must be remembered that good natural reproduction cannot be counted upon to take place any farther from the base of the trees than a distance equal to the height of the tree or half again that distance. This rule, of course, would have exceptions, varying with the topography of the country and the species.

To consider the management of spruce flat. This is the best type of spruce timber and can oftentimes be managed by a diameter limit cutting. In the case of all diameter limits, we must be sure and not make them rigid. In scientific management the first principle is to insure reproduction and oftentimes in cutting to a rigid diameter limit there are not enough seed bearing trees left on an area to give the proper reproduction. Our system of cutting should be such that wherever it is necessary to leave trees over the given diameter, it should be possible to do so. In this type of spruce windfall is of the

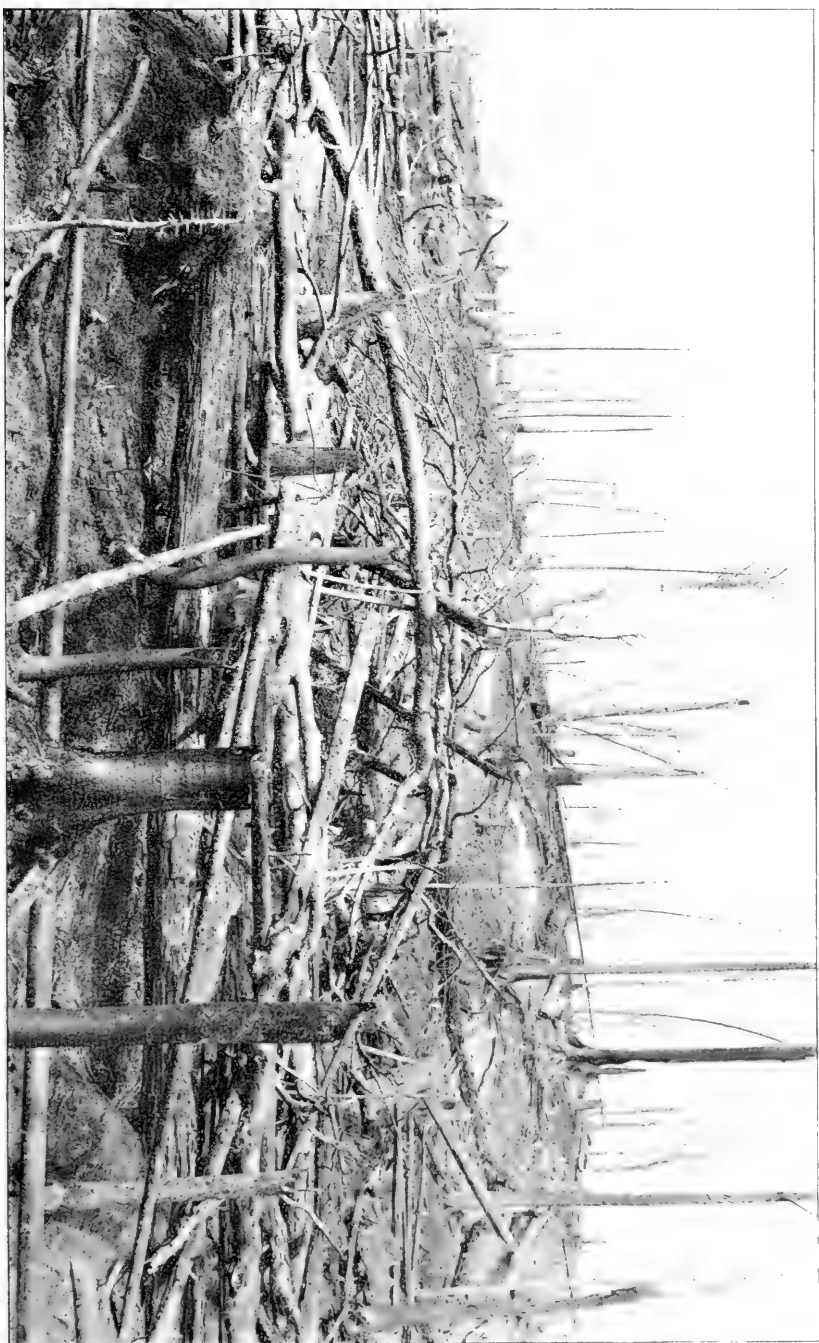
least importance. However, even here we must be very careful, if the stand is anything like pure spruce, to eliminate as much as possible the loss through windfall by judicial cutting.

On such locations the spruce is oftentimes small and of a very even diameter, and cutting to a diameter limit oftentimes means taking all or none. The cutting system should be such that it would be possible to remove all timber not needed for the regeneration of the stand and yet at the same time prepare against windfall loss, as on this type of soil the windfall damage is liable to be quite severe.

Virgin white pine stands should be handled by some sort of a clear cutting method, leaving seed trees as individuals or groups. Wherever seed trees are left as individuals the loss is oftentimes as high as 75 or 80 per cent. through windfall and much the better system is to leave the seed trees in small groups uniformly scattered over the cutting areas. On some operations the groups left have contained 25 to 30 per cent. of the original stand and after reproduction is established there is enough timber left in the groups to make a second cut profitable and thus our seed trees are not left at a loss as they might be if only just enough trees were allowed to remain to insure reproduction.

Here, as with the spruce types, a diameter limit should be an elastic one, cutting over or under as conditions warrant, but keeping, on the whole, to an average diameter. In the case of good markets and easy access to the forests, a selection system is sometimes used, cutting out from time to time only the best individuals. Unless the method is very carefully carried out it is very liable to result in deterioration of the forest.

Second growth white pine will have to be managed differently in most cases. Here we will not be willing to wait until the trees are old enough to bear sufficient seed and as these second growth stands can usually be termed even aged, they will have to be clear cut and planted to have anything like satisfactory resulting conditions.



RESULT OF LUMBERING AND FIRE.



RESULT OF A CROWN FIRE.



OBSERVATION TOWER ON A MOUNTAIN TOP.

In cutting hardwoods for saw timber, a rigid diameter limit is usually employed and the forests are left in an extremely bad condition due to the fact that all old culls are left on the ground and these usually form a large per cent of the stand in the Adirondack region. These culls should be removed wherever it can be done without loss and where they have to be left they should be killed by girdling in order to give the young trees all the light and soil energy.

The first cutting in hardwood stands is sometimes a selection cutting, taking out the cherry or ash or whatever the most valuable species may be and thus practically doing away with any possible reproduction of the species bringing in the greatest return. If a hardwood stand is to be kept at anything like its maximum capacity, we must aim in all operations to get rid of the large, over-mature and decayed specimens which are commonly called culls. Of course this means much added expense during the first operations, but it means also a tremendous financial gain at future cuts. On the whole, then, hardwoods could probably be cut to advantage by using an elastic diameter limit, taking care in all cases to make such cuttings as will improve the condition of the stand.

The greatest future profit could probably be realized from hardwood stands by underplanting with softwood species.

The consideration of lumbering methods and markets hardly need be commented on, as such studies would be absolutely necessary to any operation.

WHAT FORESTRY HAS DONE.

Most people who have been interested in the subject of conservation for the past few years know that this movement is nothing new to the world, but that it has been practiced for centuries by many of the European countries. In fact forestry is practiced by every civilized country in the world except China and Turkey, and these countries, China in particular, are glaring examples of what deforestation can do to wreck the prosperity of a nation.

These two countries are close to the bottom of the scale of civilization and bring out well the force of the statement that the progressiveness of a country can be measured directly from its practice of forestry.

England is the only exception to this rule and before long she must take decided steps in reforestation, as the timber exporting countries of Europe are fast coming to the point where they need at home all they are able to produce.

The principles of forestry are much the same the world over and they may be reduced to two fundamental principles. First, that of obtaining a maximum yield per acre from forest land; second, cutting annually only what the forests produce.

The European countries have passed through the stage in which the United States finds herself today. Forestry in the United States as it is being put forward by its exponents is not guess work by mad theorists; it is a definite, practical science, which has been worked up by countries which have been forced to provide a wood supply and forest cover or perish from the earth. The countries which have gone farthest in this direction and have the smallest areas of waste land are those which are the most prosperous and have the brightest future. They are also the countries which have spent the most money per acre for forestry.

WHAT FORESTRY CAN DO.

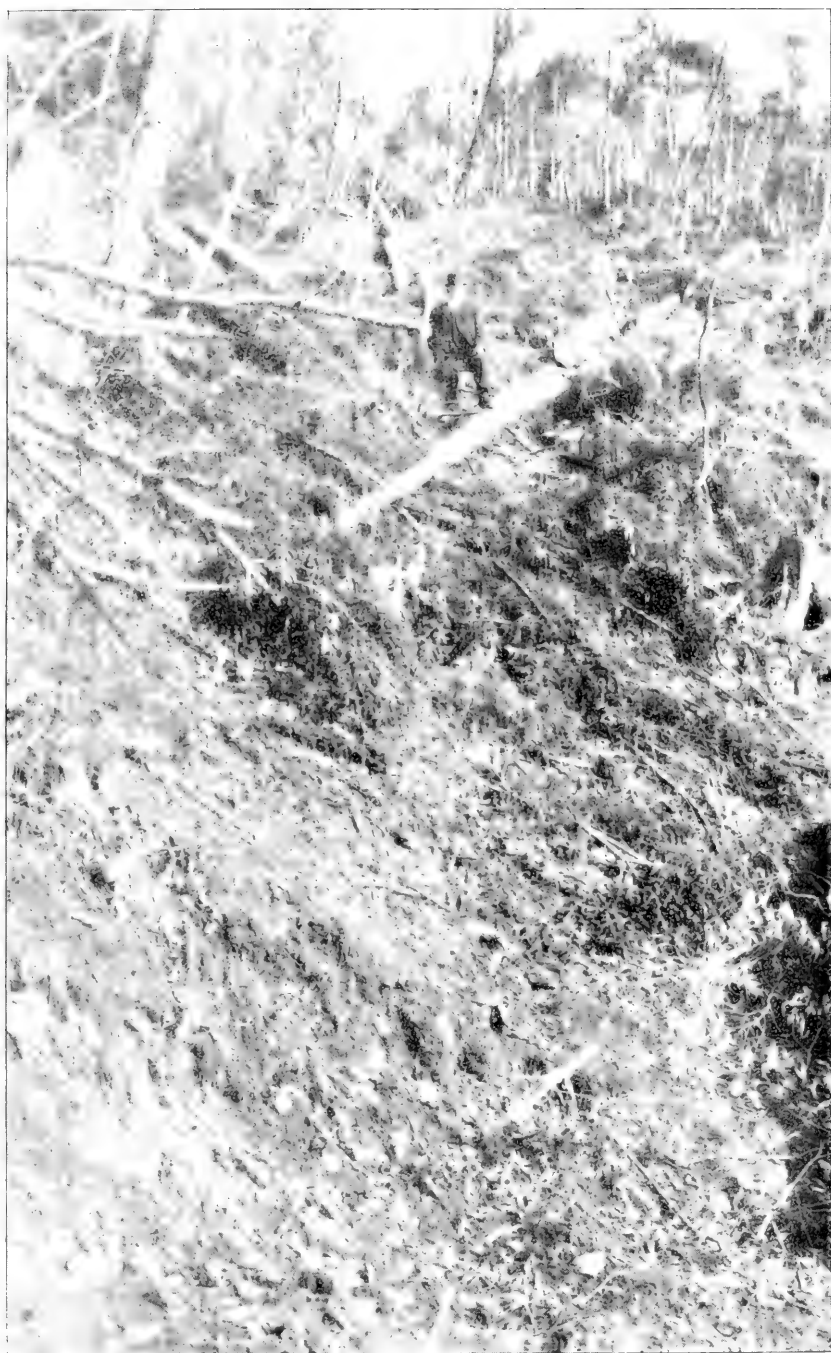
By looking over the examples of forestry in other countries, we can see very plainly that forestry pays; and it pays returns in a like proportion to the money expended for proper management.

The United States is as yet only in the first stages of a good conservation policy and it is extremely important that, if we wish to preserve our prosperity, we learn from the experiences of other countries, rather than wait to be forced into the proper channels.

Forestry in the United States and particularly in New York State can accomplish certain results. This is not

UNLOPPED TREE TOP.





TREE TOP PROPERLY LOPPED.



WHITE PINE STAND IN NEED OF THINNING.

guess work, as we have history and figures from European countries, therefore we are not starting out on something of which we do not know the final outcome.

The variety and value of our forests are unequalled anywhere in the world. The transportation facilities of the United States are the best in the world and enable us to exploit all forest re-

gions so that timber best suited to certain uses can be so used.

Many of the large lumber companies in the State are planting up their land. The lumber companies of New York are not doing this because it increases the beauty of the country or to protect the watersheds. They are doing it because they consider it a good financial investment.



SAME STAND PROPERLY THINNED.

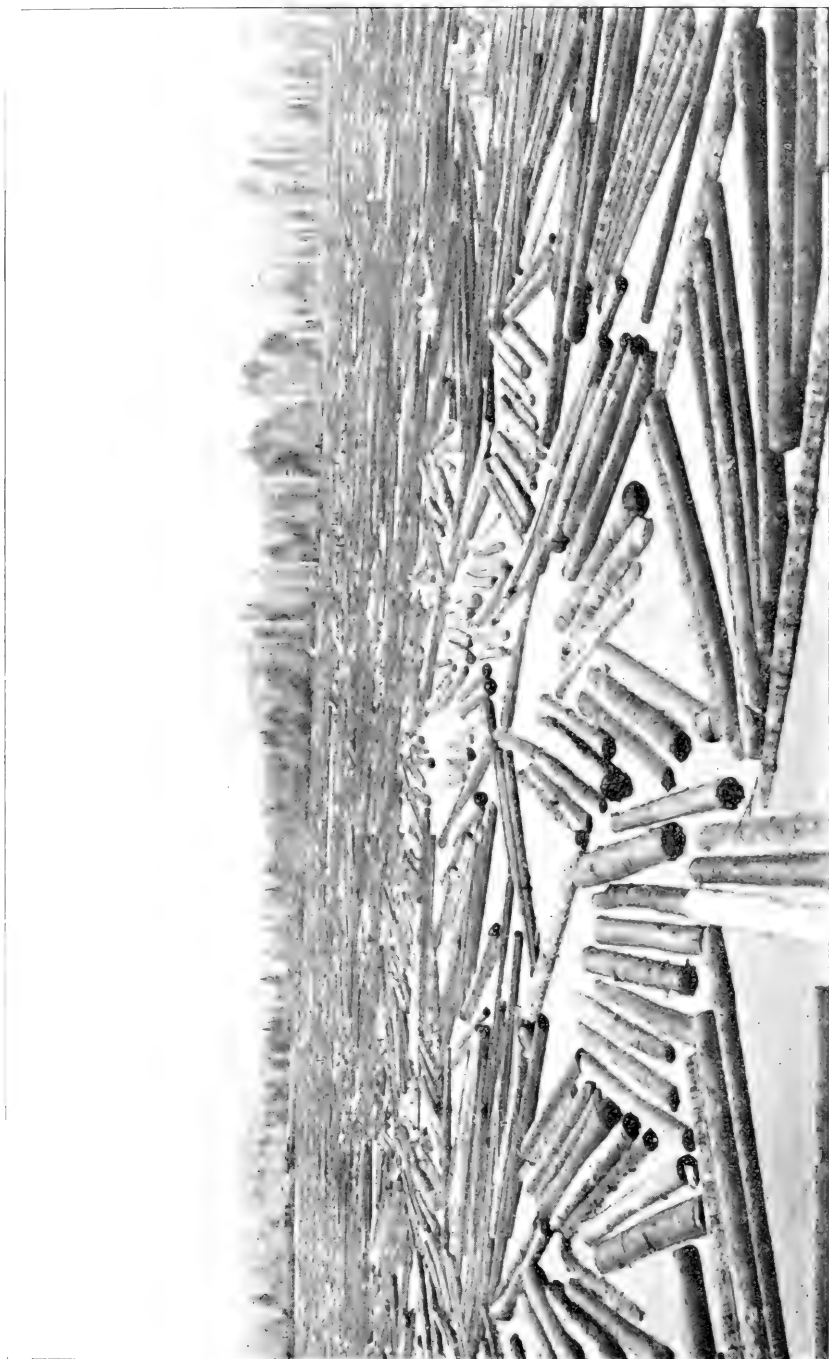
Practically all of the large operators in the Adirondacks are cutting to a diameter limit. This limit is too low in most cases, but it is a start in the right direction. As the market conditions improve, the intensiveness of this management will increase, as lumbermen are primarily business men.

It is the duty of foresters and fores-

try to show why management should be carried beyond the present market conditions; to show that plantations made properly and cared for as they should be will yield three or four times the quantity of timber per acre that nature would yield if left to herself. This timber will be straight, with but little taper and will contain as much clear



LOGS ON THE SKIDWAY IN THE WOODS.



LOGS BEING DRIVEN TO THE MILL.

lumber as the size of the tree will permit. The timber will be grown in the shortest possible time.

If we do not care to plant, and it really is not necessary in many places, the practice of good sane forestry will cut our crop in such a manner that the resulting conditions will be the best possible for the future crop. It will reproduce our stand to the species which are the most valuable and it will determine just when our crops should be cut in order to yield the greatest financial return. It would also take into consideration the market conditions. For example, a practice of forestry would not allow the cutting into cordwood or acid wood such trees as might be sawn into \$60 lumber.

In fact forestry means nothing more nor less than getting the greatest yield from a tract of woodland in the shortest time at the least expense.

From a forestry standpoint conditions over the greater part of the Adirondacks are very poor. As Gifford Pinchot said recently, "Forestry is practiced everywhere in New York State except in the woods." There are some exceptions to this, of course, but in the main it is very true.

A crop started now would hardly be mature by the time there is a serious

shortage of native timber and stumpage will be a great deal more valuable than at the present time. Bearing this in mind, it is possible to do a great deal now that the present market conditions do not warrant.

Aside from the Adirondack and Catskill regions there is a big opening for forestry in connection with farms and in the establishment of communal forests. There are over 4,000,000 acres in farm wood lots and 2,000,000 acres of unimproved farm land in New York State. A great deal of this must remain under forest cover and where the wood lots of the State are earning from 25 to 50 cents per acre per annum they will furnish a net revenue under intensive management of \$1 to \$5 per acre.

To sum up, a proper regard for the principles of forestry will keep our forest cover intact or practically so, it will do away with fire and will therefore make our hill and mountain sides the much needed reservoirs for our streams and thereby save the country from the waste of floods and insure the maximum amount of power to our industries, as well as furnish them a maximum supply of wood.

*Extracts from a recent bulletin issued by the New York Conservation Commission.

AFFORESTATION IN SOUTH MANCHURIA

Saplings of pine and acacia trees were transplanted by hundreds of thousands last year on the bare hillsides extending from Sungshoushan to East Chikuanshan, Port Arthur. The civil government office has decided to transplant over 800,000 saplings of scrub oak, pine, and acacia in an area of about 360,000 tsubo (about 295 acres) on the same hillsides next year. This will complete the afforestation program for the range of hills running in the shape of a crescent along the northeast of the fortress town.

FORESTS IN CHILE

The Chilean Congress is seriously discussing a revision of the forestry laws of that country with a view to preserving the large area of forests now in existence and to increasing them in the arid portions of the country north of Valparaiso. During the past few years large areas of forest lands have been cleared for agricultural purposes and it is still going on.

The forests of Chile contain several species of very useful timber, among them being roble, known as Chile oak, and very useful for its great strength is required; rauli, valuable for furniture, giving a good polish and grain, and laurel, noted for its excellent tanning bark, said to equal the tree known for this property; quillay, or soap tree, very valuable for its bark for cleansing purposes (it yields also fair timber); clmo, or elm, that grows very large and makes about the best light lumber produced in the country.

THE SALVATION OF THE ALASKAN FUR SEAL HERD

BY HENRY W. ELLIOTT

WHEN I returned in 1874 to the Smithsonian Institution, after spending the seasons of 1872-74 on the Seal Islands of Alaska as the agent of that establishment and of the Treasury Department, I submitted the results of my investigations and my collections to Professors Henry and Baird.

One of the most interesting of the returns was my census of the fur seal herd, whereby I exhibited proof that at least 4,700,000 seals of all classes were in existence on and around the Pribilof Islands during the summer of 1874. The complete elaboration and publication of this work was made in 1880-81, and published by the 10th Census, U. S. A., Vol. VIII, and by the U. S. Commission of Fish and Fisheries, as Special Bulletin 176, 1882.

In 1889, when the subject of whether the lease should be renewed on the same general terms as had been fixed in the first one dated May 1, 1870, a dispute arose as to the condition of this seal herd, and the number of seals which could be safely killed annually by the lessees. The old lease permitted a maximum of 100,000 per annum: but the agent of the department in 1899, reported that it was not possible or proper to kill more than 60,000 in 1890, and that that number should be fixed as the maximum in the new lease, to date from May 1, 1890, for 20 years.

Secretary Windom, accordingly, so ordered it. His action stirred up bitter criticism by the new lessees. He therefore sent for me and asked me to make an investigation of the conditions as I should find them on the islands. An Act of Congress approved April 22, 1874, was my warrant for going as Secretary Windom's special agent for that purpose. I landed on the Seal Islands May 21, 1890, and went to work. I returned and placed the finished report in

Mr. Windom's hands on November 19, 1890.

I reported that I had found a "scant million" of seals in the herd which numbered 4,700,000 in 1872-74. I urged an immediate suspension of all work of the lessees and submitted those records of that killing which warranted this suspension. I also asked that steps be taken to induce Great Britain to co-operate with us at once so as to prevent any and all pelagic sealing, which had suddenly become since 1886 a positive and certain menace to the life of the herd.

I objected to the claims being made by Mr. Blaine of certain jurisdiction over the open waters of Bering Sea and of a property right in the bodies of the seals no matter where and when they were found at sea. I was so insistent on this objection that I parted company with Secretary Blaine April 22, 1891, and withdrew from any and all connection with the Government in the preparation and submission of the case to the Bering Sea Tribunal at Paris, 1891-93, inclusive.

The result of the work of that tribunal, when fully disclosed by the end of the season of 1894, declared its flat failure to save the fur seal herd of Alaska from the destruction it was to prevent. Then ensued attempts to re-open and revise these abortive rules and regulations of the Bering Sea Tribunal begun in 1895 by Governor Dingley in the House and renewed by him in 1896, only to end in the failure of each and every move made to that end, until John Hay took the subject up in 1900-1904 with me. The Act of April 8, 1904, which re-opened and provided for a revision of the Bering Sea Tribunal's award, was secured by my active personal work and I was then asked by Mr. Hay to frame up a treaty of settlement for this vexatious dispute.



HENRY W. ELLIOTT.

"The man who did by far the most of the work that saved the fur seal industry to the people of the United States."

W. T. Hornaday.

I then prepared the first draft, which was submitted to the Canadian Government April 16, 1904, by Mr. Hay. It was not satisfactory or definite enough to meet Sir Wilfred Laurier's idea; so on Feb. 28, 1905, I outlined and submitted to Mr. Hay the plan of "mutual concession and joint control," which is now in effect. Then, on Mr. Hay's request, the Senatorial Committee (Governor Dillingham, Chairman), approved it March 17, 1905. But Mr. Hay's illness, which caused him to leave the Department of State March 15, 1905, never to

return to resume his official duties, caused a total suspension of this work until it was forced up and out Feb. 8, 1911, as follows:

The Canadians served notice on us in 1897-99 that as long as we fostered private interests (i. e., leased the islands to contractors) they would do nothing to disturb their private interests at work in killing seals at sea (i. e., the pelagic hunters). I understood that sentiment well in 1890-91, and vainly endeavored then to get Mr. Blaine to recognize its importance. John Hay promptly saw



DR. W. T. HORNADAY.

A leading member of The Camp Fire Club of America and director of the New York Zoological Society.

it, and approved the suggestion. The lessees exerted their influence on him as they had so successfully done on Mr. Blaine, but in vain. Had John Hay not fallen ill, March 14, 1905, this treaty of today, the "Hay-Elliott" Treaty of March 7-17, 1905, would have been in effect by June, 1905.

Mr. Hay's death, July 1, 1905, put the lessees into the saddle again, and not a move to disturb them was made by the officialism in charge of this business until they had nearly finished the full term of their twenty-year lease, in 1909, and then attempted to have it renewed with

the full consent and approval of the Secretary of Commerce and Labor, Mr. Nagel.

Then the trouble began for Nagel, and incidentally for Knox. When the semi-official press dispatches from Nagel carried the news that he was about to renew that seal lease, the Camp Fire Club of America, aroused by its sinister import, warned Nagel not to do it; it issued an appeal to the country which was extensively published December 12, 1909; this publication set forth the reasons why that lease was one of the chief causes of destruction of the seal herd,



THE "ROOKERY" AND "HAULING GROUNDS" OF "TOLAVINA"; SAINT PAUL'S ISLAND, PRIBYLOV GROUP; BERING SEA.

This breeding-ground contained, in 1872, at the time the above picture was made, about 400,000 fur-seals, of all ages. The "hulls," "cows" and "pups" occupied the space in the foreground, and the "hauling-grounds" in the rear were occupied by the yearlings and "blachlo" seals. One mile from the foreground to the distant bluffs, and from 500 to 1,000 yards back from the cliffs, every vestige of grass and vegetation had been polished off by these seals. Last summer, not one seal hauled out on this great plateau, and the ground was covered with grass and flowers. Of the multitude shown above, not more than 2,500 head now survive on this "rookery."

and urged all good citizens to write to their representatives in the Senate and the House to enact legislation which would prevent its renewal, etc.

Under the lead of Dr. W. T. Hornaday (who came to Washington), the Camp Fire Club so stirred the Senate Committee on Conservation of National Resources, that on February 26, 1910, it notified Nagel that that lease must not be renewed. It then passed a bill in the Senate, March 20, 1910, which repealed the leasing law and which it believed paved the way to an immediate taking up of the Hay-Elliott treaty plan of March 7-17, 1905, and a close season of at least five years to all commercial killing of seals on the Pribilof Islands.

But Secretary Nagel did not respect this understanding with the Senate Committee, and resumed the killing of seals in 1910, taking 12,920 that year, of which 7,733 were so taken in violation of his own rules and the law. This violation is now a matter of official record and is indisputable.

This stirred the Camp Fire Club to renewed action and, on Jan. 9, 1911, Senator Knute Nelson introduced a bill (S. 9959) which peremptorily suspended Nagel's work on the islands and renewed the demand for a treaty to prevent pelagic sealing. I sent to Senators Nelson, Dillingham and Dixon the proof of Canada's willingness to immediately sign with the State Department a fur seal treaty based on the Hay-Elliott memorandum, and Senator Dixon himself, on January 19, 1911, took this proof to the Department of State. It was not denied there, and the officials concerned declared that this treaty would be speedily taken up with Canada; that it would be submitted to the Senate "in a few days," etc.

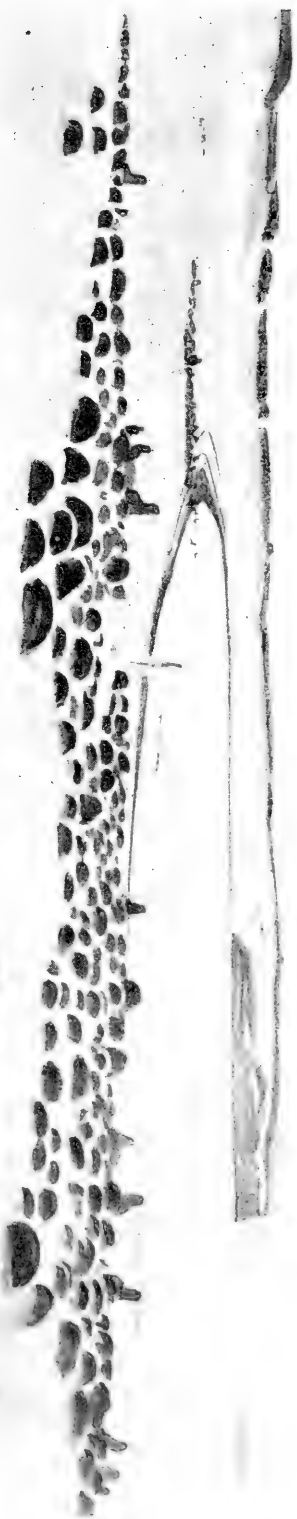
On February 2, 1911, having heard that this treaty was not being taken up, Senator Dixon called a meeting of his Committee on Conservation of National Resources for February 4, 1911, and summoned Hornaday, Nagel and myself to appear and to be heard on the Nelson bill (S. 9959), then pending before it. The Committee assembled and Messrs. Hornaday, Nagel and his offi-

cials and I appeared promptly at 10 a. m., when a message from the Secretary of State was given to the Committee, asking that no action be taken on the bill since the "fur seal treaty would be sent to the Senate by next Wednesday," Feb. 8, etc., i. e., a treaty between Great Britain and the United States. A treaty was submitted. It was referred to the Senate Foreign Relations Committee, and on Feb. 15, 1911, reported back to the Senate *without amendment*, and *ratified without a dissenting vote on that same day*. The terms of "mutual control and concession" were kept secret until Japan and Russia came into agreement with them. This complete accord was reached July 7, 1911, and the Senate confirmed it July 24, 1911, two days after it was received from the State Department, *without a dissenting vote, or a word spoken on the floor!*

This fur seal treaty now in effect is exactly as I drew its terms in 1905, and as it was approved then by John Hay, Sir Mortimer Durand, the British Ambassador, and the Alaskan Committee, consisting of Senators Dillingham, Nelson and Burnham. This proof of its origin was distinctly given to the Senate when the bill putting it into effect was passed by the Senate, August 15, 1912, by Senators Nelson and Dillingham, and not disputed by a single soul on that floor, but admitted as such by Senator Root.

Why was this bill putting into effect that treaty of July 7, 1911, not passed until August 15, 1912? Why was a bill introduced December 21, 1911, not acted upon until the late date just cited? The reason is that its opponents deliberately drew a bill at the opening of the session, in December last, which, *if not amended, would have nullified the express terms of the treaty itself and defeated the attainment most desired by the treaty makers—the restoration of this pitiful remnant of the herd now surviving, to its former fine form and numbers!*

It should be distinctly and firmly held in mind that this killing "section 11" of that bill was drawn so that the killing should be continued on



THE DESOLATE HAULING GROUNDS OF THE FUR-SEAL AT ENGLISH BAY, ST. PAUL'S ISLAND, PRIEYLOV GROUP, BERING SEA.

In 1872 this field of view was covered with tens of thousands of bachelor seals. During the breeding season of 1872 there never was a day between the 20th of June and the 20th of October in which this field did not contain from 150,000 to 350,000 bachelor seals. In 1890 never more than 5,000 bachelor seals ever were seen upon it at any one time; and during the season of 1909 there never were more than 500 young male seals.

the islands, just as it has been so done during the last ten or twelve years, to the great *and unlawful injury* of that life so destroyed. It was the intention of the framer of this bill that it should be put through without any amendment of Sec. 11. A report upon it was written by the officers of the Department of Commerce and Labor for Mr. Sulzer who, on Feb. 3, 1912, presented this bill to the House and also that report, *H. R. No. 295* to accompany *H. R. 16571*.

Not a hint was given of any minority objection to it in that Committee's report, and on Feb. 7, 1912, an attempt was made to "railroad" it through the House as an "urgent measure, unanimously reported to the House." Only by accident did one of the members of the Committee learn what was being read at the Clerk's desk in time to prevent this action and throw the bill over to the next week. On Feb. 14 it was amended so as to order a close time of one year, and then passed over to the Senate for final consideration.

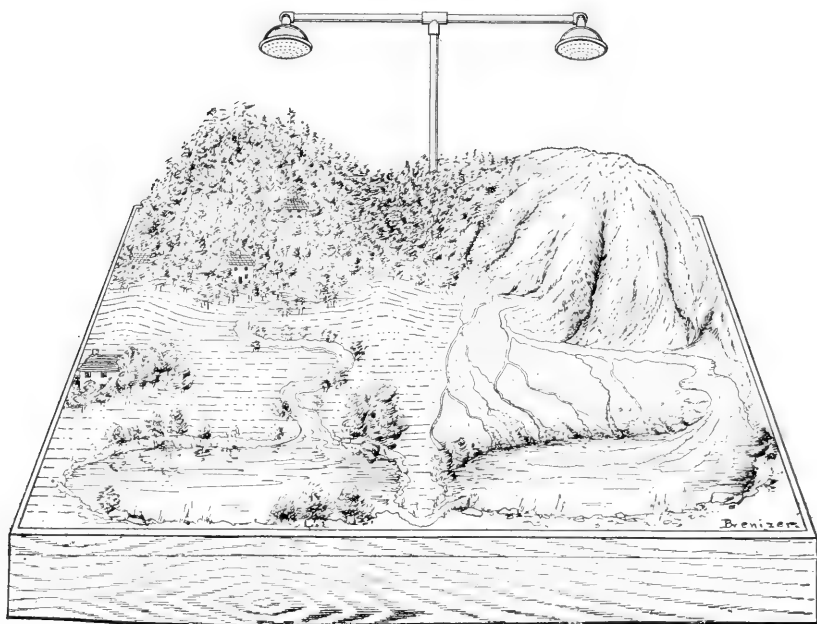
In the Senate Committee on Foreign Relations, on March 22d, 1912, this "one year close time" was amended so as to give the herd ten years of rest; and this bill was so reported and placed on the Calendar. The Senate Foreign Relations Committee carefully reviewed the whole history of this treaty as it had been ratified July 7-24, 1911, and found that it was the same one which I had drawn for John Hay in 1905 and that it carried a distinct order for a close time on the islands of "10 or 12 years" from the date of its acceptance. The conditions demanding a close time in 1905 were not as imperative as they were in 1911, and there was no logic in the arguments used by Nagel's "scientists" against it. Doctors Jordan, Stejneger, Merriam, Lucas and Townsend

all declared that if these young male seals were not annually killed off to leave not more than 5% of their normal number, they would grow up to fight so savagely among themselves on the breeding grounds that they would greatly injure the prosperity of the herd. One advocate recorded the opinion that in fifteen years' time the species would exterminate itself!

When this Senate Committee had finally perfected the House bill, and it was placed on the Senate Calendar, March 22, 1912, then the opponents tried to so delay the consideration of it in the Senate that it would not be brought up until the last hour of the session, with adjournment close at hand. Then the plan was to try and force the House bill on the Senate as the only one which could be agreed upon. This failing, they were to let the bill die in conference, and rush through in lieu of it a joint resolution paying the \$100,000 "advance" money ordered by the treaty, leaving the treaty in effect, and permitting the killing on the islands.

This scheme was recognized in time by several wise Senators, and very soon it became evident that the scheme proposed would fail to work. It did not work. The bill was called up and put through August 15, 1912, just as the Senate Committee had reported it, with the full ten years close time amendment. In conference with the House a compromise was fixed at five years as a "close time," and in that form the bill passed both Houses on August 19, 1912.

Thus was the fur seal industry finally fought for and saved to the nation. Now when that herd is surveyed, five years hence, by a competent authority, the condition of it will be known. If it is wise to resume killing, or not, it will be apparent, and the facts will govern action in the premises.



A WORKING EROSION MODEL FOR SCHOOLS

BY DON CARLOS ELLIS

A WORKING model showing the processes of erosion on deforested slopes has been a feature of exhibits made by the Forest Service at recent expositions. It shows the working out of the natural phenomena so well, and is so simple and inexpensive to construct, that a description is here given of a similar model which might be erected in schools for the use of classes in nature study, elementary agriculture, and physical geography.

The model consists of two hills sloping down into two valleys through which two streams wind in and out through farm land and lead into two lakes at the front of the landscape. (Fig. 1.) Both hills are made of the same kind of soil, that of the region in which the model is erected, but one is covered thickly with twigs, young trees, or shrubs, to simulate a forest, underneath which is a heavy carpet of moss representing the layer of leaves and twigs which covers the ground in the

real forest, while the other hill is bare of all vegetation.

By means of a suitable sprinkling device water in the form of rain is made to fall with equal force upon the two hills. On the forested slope its fall is broken by the foliage and it drops gently upon the moss-covered surface of the ground. The moss and the soil beneath, which is kept soft and porous by the protective cover, quickly absorb the rain and allow it to seep out as clear water farther down the slope, thus forming a mountain stream which flows through a green and fertile valley into a clear lake at the lower end of the model.

On the other slope the rain beating down upon the unprotected and hardened surface washes deep gullies in the hillside, carries the soil into the turbid stream which drains the valley below, and thence into a muddy lake. The erosion on the slope loosens stones, which are carried down upon the valley farms; the silt deposited in the channel

of the stream diverts the water, which opens up gullies through the dry land; the main stream is made shallower and wider and often overflows into the fields; islands and silt bars rise in the stream; and deltas are built up in characteristic form at the entrance to the lake.

The erosion processes which work themselves out in this model, the wearing down of the hill, the silting up of the stream bed, the gradual shifting of the course of the stream, the formation of deltas and sand bars in the lake, and the gradual opening up of watercourses through them are all typical of the processes constantly going on in nature and show strikingly the close relationship between forests and surface formation. It is the same process of erosion on a larger scale which, after the destruction of our forests, causes the removal of the top soil from our slopes, cuts them up into gullies, and deposits sand and

gravel upon the fertile alluvial soil of the bottom lands, in storage reservoirs, or in the channels of streams, where it impedes navigation and causes overflow.

While the model is not intended primarily to show more than the erosion processes, it can be used to show also that a forest-covered slope acts as a reservoir in impounding the water and allowing it to seep slowly into the streams, and, on the other hand, that water runs off the surface of a bare slope as soon as it falls, resulting in floods when the precipitation is heavy and in droughts during a dry season. If the sprinkler is stopped and all the water taken out of both of the streams and the lakes, the lake on the forested side will, within a few hours, receive a considerable amount of water as seepage from the wooded hillside, while the other lake will remain practically empty.

HIGHER PRICES WILL CONSERVE FORESTS

BY N. P. WHEELER

HIGHER prices for standing timber and its products will tend to conserve the forests. When timber is cheap it is wasted; for, when cut, it is not worked up, nearly as close as when more valuable. I am confident there has been more timber burned up and destroyed in the State of Pennsylvania than has been manufactured. I have seen 8 or 10 acres of the finest white and red oak girdled just to kill it, so that it could be burned up to clear the land. In fact, that was the common way of clearing the land, the only way of marketing in those days was by manufacturing by water power and seeping down the tributaries of the Allegheny and the Allegheny and Ohio to Cincinnati and Louisville. Only the best of the white pine was taken. The stumps cut breast high and fifteen feet of the bulk of every tree left in the woods and all the tops above the limbs. Not to exceed 50% of the selected tree was taken,

the rest being left to rot. No hardwoods could be floated and were therefore not considered valuable. I have seen white pine girdled to kill it to clear the land. Once when our rafts were lying by for high water in the Ohio a larger mass of fence rails brought down by the high water collected behind the rafts. To my surprise I found these fence rails were the finest of black walnut. When the tanneries first came up into Western Pennsylvania hemlock was cut just for the bark, and thousands of acres after the bark was taken off were left to rot or burn. Now that hemlock has become valuable, it is all gathered up that will make lumber. In many places the limbs, tops and branches are gathered up for pulpwood and not enough left to make a bad fire, thereby protecting and conserving the forest. When blackened over by fire it cannot be used for pulpwood. These are some of the reasons why I am confident higher prices will tend to conserve the forests.

A NEW PROCESS FOR THE PROTECTION AND PRESERVATION OF STANDING TELEGRAPH AND TELEPHONE POLES

By E. A. STERLING

MODERN methods of transportation and communication have caused such a drain on the timber resources of the country that high prices and an ultimate exhaustion of certain species grades will be the inevitable result. The use of wood is universal everywhere, but nowhere is it more strikingly shown than in the enormous number of poles which dot the landscape everywhere, their most general use being for telegraph, telephone, trolley, and electric transmission lines.

The pole lines in the United States approximate eight hundred thousand miles in length, and the number of poles in actual service is not less than thirty-two million. The annual consumption for renewals and new lines amounts to nearly four million poles, or nearly five poles per mile per annum, the actual figures for 1910 being 3,870,694. The extent of the drain on the forests which this represents may be judged from the fact that a perfectly stocked German forest produces only 250 trees per acre, so that on this basis the poles now standing would represent all of the timber growing on over 130,000 acres. Actually in this country, considerably less than one hundred poles are cut per acre, so that for the poles now in use forest areas aggregating nearly half a million acres have been cut over, and to furnish the poles for renewals some 50,000 additional acres are cut over each year, or at the rate of over 100 acres per day.

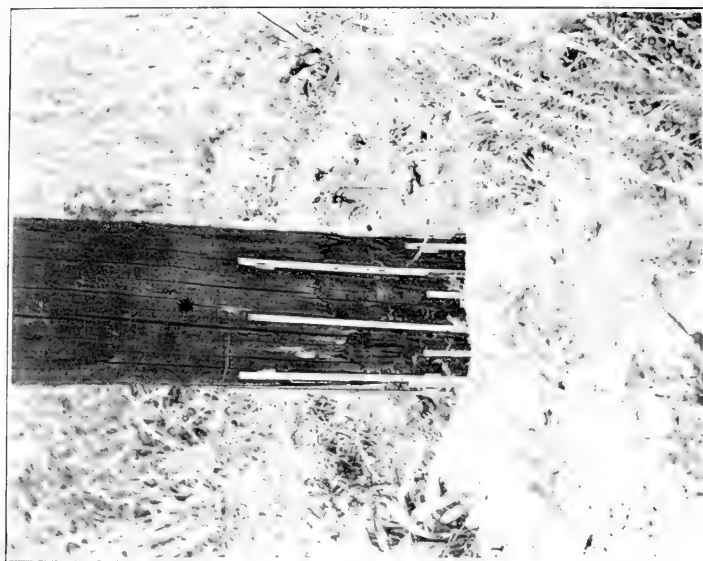
Cedar furnished the material for nearly 63% of the poles renewed in 1910; while chestnut, although available only in a limited territory, ranked second with 17%. The supply of cedar is distinctly limited and will soon be

exhausted, while the wide prevalence of the chestnut bark disease threatens to remove this species from the market within a few years. The maintenance of a cedar pole supply by new growth is not even a remote probability, because of the slow growth of the species. A report of the National Electric Light Association states that thirty-foot cedar poles lasting 14 years have taken about 190 years to reach that size, thus it would require 13 growing cedars to continue in service one 30-foot cedar pole. To maintain one 30-foot chestnut pole, even in a healthy growth unaffected by the blight, would require four growing trees. These facts indicate clearly the necessity of preserving the poles now in use as well as those used for current renewals.

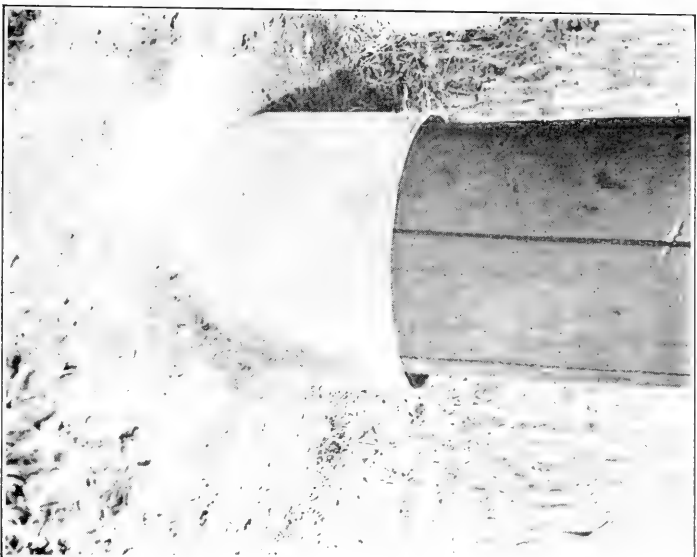
The available statistics indicate an average life per pole of from 13 1-2 years for cedars to 6 1-2 years for pine; the general average based on present renewals being about ten years. A report of the German government shows an average life of only 7.7 years on 153,626 untreated poles under observation. Until recently practically all poles in this country were used in their natural state, and great waste has been occasioned by their rapid decay where in contact with the ground. The U. S. Forest Service estimates that, for poles, 95% are destroyed by decay, 4% by insects and 1% by mechanical abrasion. In 1910, 825,000, or nearly 25%, received preservative treatment either before or after purchase, and this should lengthen their life from 50 to 100 per cent. While the treatment of a pole before it is set is advantageous, it adds very materially to the initial cost and will not check the increasing consumption until a greater per cent are treated,



EXCAVATION AROUND POLE AND SOFT DECAY
SCRAPED AWAY.



SPACING RODS IN PLACE.



THE FORM IN PLACE.



POURING THE FILLER INTO THE FORM.

or until the majority now in place have been removed. A more immediate saving, and one which would save the cost of the poles as well as the expense of resetting them, would be a treatment which could be applied successfully to the millions of poles now in place.

The conditions under which poles are used vary so greatly that an average cost figure for pole renewals is difficult to determine. Generally speaking, the cost may vary from \$1 to \$2 per pole for country telephone lines to \$100 or more for the high poles in city streets. The initial cost of the pole varies from \$1.80 for a 25-foot cedar pole to \$16.21 for a 60-foot pole of the same, or \$17.08 for a chestnut pole of the same length, to which must be added the labor of setting, restringing wires, accessories, etc. A fair average for a commercial line along railroads or through country districts, with three to five cross-arms, would be about \$10 per pole, including all items. This would mean that the poles now in use in the country represent a value of \$320,000,000, and that the annual renewals cost in the neighborhood of \$40,000,000. It is obvious that any treatment which can be applied to the standing poles, and which will increase the life of those now in use even a few years, will result in an enormous saving.

Practically all poles fail at the ground line because of decay, and on account of this weakening at the base have to be replaced or cut off and reset, while the top portion is still sound. This decay is caused by wood-destroying fungi which have a definite origin and develop under the same fixed laws of growth that govern the higher forms of vegetable life. Fungus growth has its origin in microscopic spores which are comparable to the seeds of plants, and as they are present nearly everywhere, it merely remains for them to find favorable conditions under which to germinate and develop the microscopic threads which permeate the tissues of the wood and destroy its texture. The fundamental factors necessary for the growth of fungi are moisture, air, and a certain degree of warmth.

These conditions are found in favorable combination at the ground line of poles, where the moisture from the earth keeps the surface of the wood moist, and where, just underneath the surface, the soil maintains, except during the winter season, a sufficient degree of warmth for the fungi to develop. It follows, therefore, that the decay of poles appears from a few inches above the ground line to a distance of a foot or more beneath, the air being more or less excluded at the basal portion of a pole; while above the ground line, under ordinary conditions, insufficient moisture is present for the rapid development of decay.

Despite the clearly defined factors which cause the decay of poles at the ground line, and the annual renewal of millions of poles still sound at the top, no definite steps have been taken until recently to reduce or prevent this waste of timber. There has recently been devised by an old gentleman living in New Jersey a plan which promises to materially reduce the consumption of poles and greatly increase the life of those now standing. If it succeeds it will be another step in the reduction of the drain on our forest resources.

What is now known as the Lamb pole treatment first renders innocuous the decay which has already started, and then seals the ground line portion of the pole with an impervious preservative coating, which prevents the evaporation of the preservative previously applied and prevents further decay by entirely eliminating air and moisture.

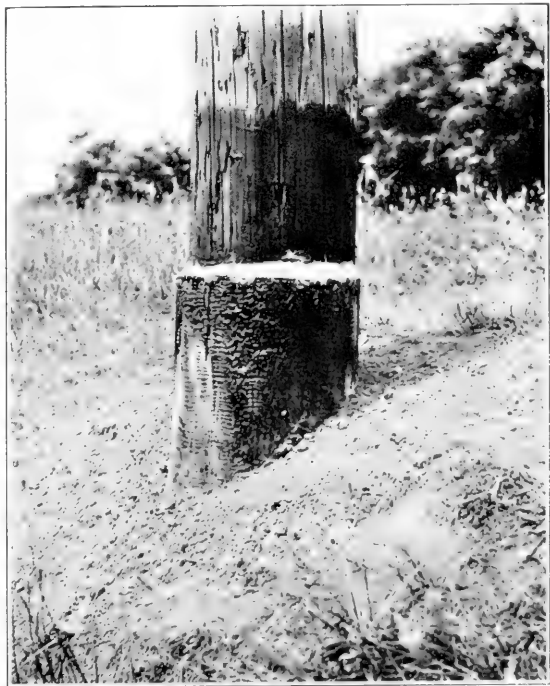
The whole process is simple and inexpensive, and consists of first removing the dirt around the base of the pole to a depth of two to two and a half feet, and scraping or cutting off the decayed portions of the wood. A hot brush treatment of coal tar creosote is then applied liberally, which kills the living organisms of decay and penetrates the outer tissues of the wood. A fire-proof casing is then placed around the pole, the upper portion extending about six inches above the ground line and the lower portion from eighteen inches to two feet below, mak-

ing a total length of from two to two and one-half feet. This casing is held out from the pole by spacing rods which leave about a half inch opening between the pole and the casing at the solid portions and a greater space where decay has existed.

After the casing is in place, the dirt is tamped in at the bottom up to the base of the casing, and inside of the form is poured a hot preparation of pitch which will yield a distillate of high boiling and high gravity creosote oil. The pitch, after it hardens, will form a perfect bond with the creosoted surface of the wood and entirely prevent the entrance of air, moisture, or other agencies favorable to decay, and at the same time prevent the evaporation of the creosote which was applied by brush treatment to the decayed surface. The creosote in the pitch acts as an additional toxic agent in destroying and preventing all forms of decay. Experiments have shown that this pitch filler will not only form a perfect bond with the wood and remain in absolutely close contact in all climatic changes, but it also entirely fills all surface checks

and, to a slight degree, penetrates the wood. After the pitch has been poured in and has cooled, the dirt is thrown back around the pole and tamped tight and a protective fireproof covering or cap of cement is applied; or, if the filler is poured to within only about two inches of the top, the edges of the fireproof casing can be bent over and tacked to the pole, thus eliminating the use of a cement cap.

The cost of the Lamb pole protective treatment is but a fraction of the cost of putting in a new pole, and under average conditions one year's increase in the life of a pole will pay for the treatment. The average pole has a life of about ten years, and the cost of replacement is averaged at \$10, hence the annual charge on a 4 per cent compound interest basis amounts to about \$1.25 per pole. If properly treated at the ground line a conservative estimate places the increase in life at from 5 to 10 years. To double the life of poles would mean a saving of 2,000,000 poles per year, which is equivalent to the pole timber on at least 25,000 acres of heavily stocked forest.



FINISHED POLE ON SLOPE.



FALL CREEK THREE MILES EAST OF ITHACA. THE PROPOSED DAM WILL BE CONSTRUCTED AT THE LOCATION INDICATED BY THE TWO ARROWS. YOUNG WHITE PINES IN FOREGROUND ARE THE RESULT OF NATURAL SEEDING FROM NEIGHBORING TREES.

FOREST PLANTING AT CORNELL UNIVERSITY

By JOHN BENTLEY, JR.

(Assistant Professor, Department of Forestry, New York State College of Agriculture at Cornell University.)

THE needs of a big University are many and far-reaching; and when that University is still growing and enlarging its sphere of usefulness year by year, it becomes necessary to look far into the future and anticipate future needs by wise and prompt action in the present. Cornell University has developed so rapidly in the last few years, and in particular, the work of the Agricultural College has increased and broadened so much, that it is almost impossible to keep the equipment up to the demands forced upon it. Among the projects which the University has in mind to meet the increasing demands is the building of a large reservoir, on Fall Creek, for the purpose of storing up water enough to supply the needs for power, light, and domestic uses. Dependence is now placed on Fall Creek, which carries

enough water at certain times of the year; but there are times in the summer, and especially in dry seasons, when the amount of water in the creek is inadequate. It has therefore become necessary to make provision for an increased supply. This, it was found upon investigation, could be done to best advantage by impounding sufficient water at a convenient place to make possible an increased flow in the stream at times of low water, or at any other time when the need might arise.

Fortunately, a good natural reservoir site existed on Fall Creek about three miles east of the University. At this point in its course, the stream has cut through one of the numerous ridges which are a common topographical feature of this part of the country; a dam placed at this cut would flood a large area up stream, and impound a

large amount of water. Here, then, was a solution to the problem, "More water." The land, including the reservoir-site, together with a considerable area immediately surrounding it, has been acquired by the University during the past two or three years, and plans are now under way for the construction of a dam and the preparation of the site for a large reservoir.

The dam will be constructed to a height of fifty feet and this will cause the stream to flood an area of approximately 220 acres. The depth of the water will vary, but over an extensive part of the area it will average 25 feet. The capacity of the reservoir, when full, will be one hundred and fifty million cubic feet. No power plant will be installed at the reservoir, nor will there be any transmission-line; the object of the development is simply to make possible an increased flow of water from time to time as necessity requires, for the proper operation of the present power-plant which is situated near the University and about two miles below the reservoir-site, on Fall Creek.

At the time the land was acquired it became necessary to purchase considerable land which was not actually needed, either because the owners did not care to divide their property, or because the properties were so situated that division would be impracticable. It therefore happens that there is an area of approximately one hundred and eighty acres which borders the reservoir site, and which will be above the high water line after the dam has been built and the reservoir filled. The question immediately arose: What shall be done with this land above the high water line? It was considered inadvisable for several reasons to have tenants occupying those portions of the farms that would be left above the high water line, and it also seemed impracticable to maintain the land in a state of cultivation. It was, therefore, proposed to reforest such portions of it as were not already occupied by trees, and establish an unbroken forest cover which would serve a double purpose. Not only would erosion be checked, but the University would have, in process of growth, a stand of timber which will



LOOKING OVER LAND THAT WILL BE FLOODED. THE FARM BUILDINGS IN THE PHOTOGRAPH WILL BE TORN DOWN AND REMOVED BECAUSE THEY ARE BELOW THE HIGH-WATER LEVEL OF THE PROPOSED RESERVOIR.



GENERAL CHARACTER OF THE LAND TO BE RE-FORESTED. A GROWTH OF TREES AND SHRUBS IS ALREADY PRESENT ON STEEP BANKS AND ALONG OLD FENCE LINES.

some day be of considerable value. The checking of erosion is, of course, of present and permanent value in that it will prevent to a large degree the washing of soil and silt into the reservoir, and the timber will eventually have a very high value, because of the constantly diminishing supply and the resulting increase in timber values. This project, therefore, is another example of the increasingly large number of forest tree plantations which are being established for the purpose of conserving water, preventing destructive floods and erosion, and the ultimate production of timber.

When the plans of the University had progressed this far, the Forestry Department of the New York State College of Agriculture offered to take over the work of establishing the tree plantations on the borders of the reservoir; and this proposition met with such favor that the work was begun this spring. It is expected that the work of tree planting will continue in following years until those portions of the land which are not already occupied by trees will be planted with species of trees suitable to the soil and to the varying conditions which exist on the tract.

The work of the present year consisted in planting twenty thousand trees, mostly white pine, on about eighteen acres of land. The trees were obtained from the New York State Conservation Commission, and fully ninety-five per cent of the trees planted were four-year-old white pines. A small plot is also planted with Scotch pine, western yellow pine and Norway pine, for the purpose of experimentation. That the conditions on this tract are favorable for the growth of white pine is shown by the fact that white pine grows abundantly on the surrounding hills and slopes which have not been cleared in the past for agricultural purposes. Further evidence that the conditions are adapted to the growth of white pine is obtained from the fact that in fields which have not been plowed or cultivated for several years, an advance growth of white pine seedlings is slowly but surely occupying the ground. Figure 1 illustrates some of this advance growth which has sprung up naturally on one of the steeper slopes just at the water line. In several other places a large number of young white pine seedlings, not more than four or five years old, were discovered during the course of the



STUDENTS OF THE NEW YORK STATE AGRICULTURAL COLLEGE AT CORNELL UNIVERSITY PLANTING 4-YEAR-OLD WHITE PINE ON LAND ABOVE HIGH-WATER LINE.

planting, which seems to indicate that the plantation should be successful, even though the soil is in some places a rather heavy clay.

The trees were shipped from the New York State nurseries in the Adirondacks, and reached Ithaca about the 25th of April,—a little late for climatic conditions as they exist in this part of the State, but the best that could be done, considering that the nurseries are situated much further to the north, where the season is at least two weeks later than at Ithaca. They were taken out and heeled in immediately near the planting ground, and the actual work of planting was done during the two succeeding weeks by students in the New York State College of Agriculture, who were taking courses offered in forestry. The students worked in crews of two each, as shown in figures 4 and 5, one man carrying a bucket containing the trees and doing the planting, while the other one preceded him, digging holes for the trees with a mattock. This method was followed on a large part of the area in preference to planting in furrows turned up by the plow, because it

was found that the surface soil, immediately under the sod, could be utilized to best advantage when planting in holes with the mattock; whereas much of the best soil was turned up and made unavailable when the plow was used. The trees were spaced approximately six feet apart each way, making about twelve hundred trees to the acre. It is believed that this spacing is close enough, considering the favorable climatic conditions which prevail in this part of the country; and if it is found necessary, on account of losses, to fill up the fail-spots in subsequent years, this can be done at very little extra cost or labor.

The planting was completed on May 11, after two weeks of continuous work, during which the weather was extremely favorable. The days were almost invariably clear and warm, while frequent showers fell at night during the period of planting; and immediately following the work several heavy showers occurred which were sufficient to give the newly planted trees plenty of moisture. In some places the soil was rather wet for ideal planting, but taking everything into

consideration, it was much better to have had the soil moist than dry, especially where the soil was of a clay composition. Counts made on June 14 showed that 99 per cent of the trees were living, and had made a good start on their current year's growth.

The photographs illustrate portions of the tract on which the planting was done. A few old farm buildings will have to be removed, and while a part of the land is good for agricultural purposes, it is of first importance that the borders of the reservoir be protected from washing by rains, and that every precaution be taken to insure a

sanitary, permanent ground-cover.

This operation is of interest because it forms a concrete example of the value of tree planting. The planting will continue under the supervision of the department of forestry, and the students for several years to come will thus have an opportunity of doing practical tree planting. In future years the plantation will have an added value because it can be made the subject of detailed study, and it will always serve as a "demonstration plantation" which has as its double object the conservation of water and the production of timber.



THE STUDENTS PLANTING WHITE PINE IN SQUARE-HOLES MADE WITH A MATTOCK.

GEO. R. GREEN AT STATE COLLEGE

Mr. George R. Green, recently Assistant Forester of Ohio, and a graduate of the University of Michigan, under Dr. Roth, of the class of 1910, has been appointed an instructor in the department of forestry at the Pennsylvania State College.

LUMBERMEN AND FORESTERS CO-OPERATE

COMMITTEES OF EXPERTS TO INVESTIGATE MATTERS OF VITAL IMPORTANCE TO ALL FOREST AND TIMBER INTERESTS IN THE ENDEAVOR TO SECURE PRACTICAL RESULTS.

LUMBERMEN, timberland owners, representatives of fire protection associations, State foresters and delegates of the American Forestry Association held meetings during the Fourth Conservation Congress at Indianapolis on Oct. 1, 2, 3 and 4, which resulted in developments of the utmost importance to all concerned and the interests which they represented. The outcome of the conferences will be, it is expected, the reduction, to a practical working basis, of various theories, plans, experiences and proposals, regarding matters of vital concern to cutters, owners and preservers of the forests of the United States.

It was decided, following two or three sessions each day, at which the subject was discussed from all standpoints, that committees are to be appointed to make a thorough investigation of questions such as the timberland taxation problem, top lopping, replanting, reforestation, fire protection publicity, etc., as the main committee may select.

These investigating committees, composed of the most able experts upon the matters about which inquiries are to be made, will, by the time the next Conservation Congress is held in 1913, be able to report as their finding, it is hoped, definite conclusions which will be reported and discussed, according to present plans, at one whole day's session of the Congress devoted to that purpose.

In the meantime AMERICAN FORESTRY is to keep all who are interested informed of the progress the committees are able to report from time to time.

It has for some time been evident that the handling of forestry and lumbering matters in a practical construc-

tive way by the real workers, and the crystallization of loose agitation into sound and definite policies would be of the greatest possible benefit to all who are interested in the proper cutting and the conservation of the forests, and it was with this object in view that the sessions, for the discussion of ways and means to bring it about, were held.

The American Forestry Association, as the national organization for the conservation of the forests, is to take general charge of the work. A committee consisting of Capt. J. B. White, the retiring president of the Fourth Conservation Congress, and one of the leading lumbermen of the United States, E. T. Allen, forester for the Western Forestry and Conservation Association, and one of the foremost workers for forest conservation in the country, and Chief forester Henry S. Graves of the Forest Service, are to confer with the executive committee of the American Forestry Association in the selection of the committees and the questions to be investigated. This is to be done within a very short time and the important work will be well under way, it is anticipated, before the new year.

Mr. E. T. Allen presided at the conferences, and at the outset spoke of the necessity of getting together for practical work. There followed several sessions at which plans were discussed, and at the same time many of those present gave their views on the taxation question, various plans for the protection of the forests from fire, methods of fire protection, publicity as an aid to this protection, and for increasing the strength of forestry organizations, and much that was of practical value was learned. Among the speakers were E. T. Allen, Everett G. Griggs, I. C. Williams, John M. Woods, F. W. Rane, N. P. Wheeler, R. D. Swales, Wm. Irvine, Geo. E. Watson, T. B. Wyman, H. P. Baker, F. W. Besley, F. A. Elliott, George K. Smith, Henry E. Hardtner, Leonard Bronson, J. L. Scott, D. P.

Simmons, delegates Charles Lathrop Pack, E. A. Sterling, Col. W. R. Brown, Dr. H. S. Drinker and P. S. Ridsdale of the American Forestry Association, and a number of others.

Following these discussions a committee consisting of Messrs. Drinker, Besley, Simmons, Hardtner and Ridsdale presented resolutions to the Conservation Congress of which the following were adopted:

"Believing that the necessity of preserving our forests and forest industries is so generally realized that it calls only for constructive support along specific lines:

"We recommend the work of the Federal Forest Service, and urge our constituent bodies and all citizens to insist upon more adequate appropriations for this work, and to combat any attempt to break down the integrity of the national forest system by reductions in area or transfer to State authority.

"Since Federal cooperation under the Weeks law is stimulating better forest protection by the States, and since the appropriation for such cooperative work is nearly exhausted, we urge appropriation by Congress for its continuance.

"We recommend that the Federal troops be made systematically available for emergency service in controlling forest fires.

"Deploring the lack of uniform State activity in forest work we emphatically urge the crystallization of effort in the lagging States toward securing the creation of forest departments with definite and ample appropriations, in no case of less than \$10,000 per annum, to enable the organization of forest fire work, publicity propaganda, surveys of forest resources and general investigations upon which to base the earliest possible development of perfected and liberally financed forest policies.

"We recommend in all States more liberal appropriation for forest fire prevention, especially for patrol to obviate expenditure for fighting neglected fires, and the expenditure of such effort in the closest possible cooperation with Federal and private protective agencies; and also urge such special legislation

and appropriation as may be necessary to stamp out insect and fungous attacks which threaten to spread to other States. We cite for emulation the expenditure by Pennsylvania of \$275,000 to combat the chestnut blight, and the large appropriation by Massachusetts to control insect depredation, and urge greater congressional appropriation for similar work by the Bureau of Entomology.

"Holding that conservative forest management and reforestation by private owners are very generally discouraged or prevented by our methods of forest taxation, we recommend State legislation to secure the most moderate taxation of forest land consistent with justice and the taxation of the forest crop upon such land only when the crop is harvested and returns revenue where-with to pay the tax.

"We appreciate the increasing support of lumbermen of forestry reforms and suggest particularly to forest owners the study and emulation of the many cooperative patrol associations which are doing extensive and efficient forest fire work and also securing closer relations between private, State and Federal forest agencies. Believing that lumbermen and public have a common object in perpetuating the use of forests, we indorse every means of bringing them together in mutual aid and confidence to this end."

During the sessions a paper by Chief Forester Henry S. Graves, who was unable to be present, was read. A portion of it appears in another section of this issue.

At the Friday session of the Congress Major Everett G. Griggs, president of the National Lumber Manufacturers Association, read a paper in which he criticised the manner in which choice timberlands have been exchanged and defended the association of which he is president, declaring the body is not an unlawful combination of manufacturers. He declared the greatest development in forest conservation and fire prevention originated in such associations, and that the principal theories advocated by conservationists are upper-

most in the minds of members of the associations. Major Griggs urged that consumers of lumber use odd and short lengths as one means of conservation. He said the low grades of lumber, slabs and waste from a mill must bring enough money when sold to pay for the labor expended in saving them and that with rising values of timber and utilization of lower grades of lumber, the product of the entire tree will be saved. He also advocated workmen's compensation laws and pointed out the good and bad features of the compensation law which now exists in Washington.

E. T. Allen, forester of the Western Forestry and Conservation Association, spoke on "Conservation Redefined." Among other things he said:

What our forests need most is more patrolmen; more trails and telephones; more funds and organization to marshal the fire-fighting crews when required; better fire laws and courts that will enforce them; public appreciation that forest fire departments are as necessary as city fire departments; more consideration for life and property by the fool that is careless with match and spark; realization by more lumbermen that it pays in more ways than one to do their part; State officials who will handle State laws intelligently; tax laws that will permit good private management; consumers who will take closely utilized products. A few other things need specific study and action.

Do not think me lacking in ideals when I say that our greatest need is vigor and skill in appealing to human selfishness. The altruist comes to us unsought. But to reach the hand with the torch, the vote withheld, the word unspoken, we must find the man, make him listen, and show the cost of forest destruction to his particular home and pocketbook.

Capt. J. B. White, the president of the Congress, in his address spoke of the

meaning of conservation to lumbermen and said:

"We must protect our forests by preventing forest fires. Government and State appropriations must be made sufficient for this purpose. In the report of the Conservation Commission to the President it is stated that fifty million acres are burned over annually, and since 1870 there has been lost each year an average of 50 lives and \$50,000,000 worth of timber. The lumbermen's interests are to prevent fires and to stop waste; and they are anxious to co-operate with the State and with associations for this purpose, and are already doing so in many places. The true, saving features of forestry are becoming better understood, and better applied; and we will save our forests, and will grow trees wherever necessary and profitable, the same as any other crop; and there will be no timber famine in the near or distant future."

On Friday evening after the adjournment of the Congress the Indiana Lumbermen's Association tendered a banquet to the visiting lumbermen and foresters at which Capt. J. B. White was the guest of honor.

The Congress elected as its new president Mr. Charles Lathrop Pack, of Lakewood, N. J., who is a director of the American Forestry Association. Mr. Pack is the owner of extensive timber lands and is one of the best informed men on forest conservation in the United States, and he has for many years taken a deep interest in the work of the Conservation Congress and of the American Forestry Association. It is believed that Mr. Pack and the executive committee of the Congress will be willing to set aside one day of the next Congress for consideration of the reports which are to be made by the committees soon to be appointed to investigate the matters in which the lumbermen and foresters are so greatly interested.



CHARLES LATHROP PACK.

President of the Conservation Congress, elected Oct. 4, 1912. He is also a director of the American Forestry Association.

MR. CHARLES LATHROP PACK

President, National Conservation Congress

MR. CHARLES LATHROP PACK'S interest in affairs has been broad and constructive. He is an active and busy business man, who finds time for public usefulness. As a resident of Cleveland, Ohio, he has held various positions of trust. As president of the Cleveland Chamber of Commerce, he was one of the small and active group of men whose work made effective progress for a greater and better Cleveland.

For many years, Mr. Pack has been a trustee of Western Reserve University of Cleveland, where in civic work as well as in business, he had as an asso-

ciate Dr. H. A. Garfield, now president of Williams College.

He is well known as an authority on economic forestry matters, and was one of the first Americans to study Forestry in Germany. After his return from Germany, he explored in the pine regions of Canada and in the South. It was at about this time that he was paid a fee (large in those days) by the late Jay Gould for expert forestry advice; and this is the earliest record of such a fee being paid in the United States.

Mr. Pack has since then devoted himself chiefly to the lumber industry,

which is his first and always leading business. He now holds large tracts of standing pine timber, and is considered one of the leading authorities on timber and general forestry in the United States. He has also made a distinct success in the banking business, the Cleveland Trust Company having been organized in his office and he having been always one of its directors. He is also a director of the Seaboard National Bank of New York City.

His interest in sound money led him years ago to take a prominent part in the sound money movement, and he was the youngest member of the Indianapolis National Monetary Commission.

When the first Conference of the Governors of all the States took place at the White House, during Mr. Roosevelt's administration, Mr. Pack was invited by President Roosevelt as one of the experts on the subject of Conservation. Later, the President made him one of the National Conservation Commissioners. With Mr. Gifford Pinchot, his close friend, and Dr. Eliot, of Harvard College, and a few others, he organized the National Conservation Association.

Mr. Pack is a life member and a director of the American Forestry Association, and he has been very active in the movement that has during the past two years widened the field of work of the Association and increased its usefulness. He has delivered addresses on Forest Conservation and Taxation before the American Civic Association and other bodies. His work for Conservation is widely and well known, and he has been closely allied with the Conservation movement from the first. His interest is constructive and economic rather than political, and

he has refused more than one attractive political office.

But he is not only interested in the conservation of material resources, but also in those things that make for more equal opportunity, and for the conservation of human life. His unique gift to one of the New England colleges for the purpose of providing an annual sum for the improvement of the quality of the milk, butter and bread consumed by students is an example of the practical turn of his mind in that direction.

Mr. Pack was for seven years an active member of the Cleveland City Troop, later called Troop A, of Ohio, and retains as a veteran member his connection with that crack organization, which holds the record for efficiency in the Cavalry of the National Guard.

As a young boy, he lived in the pine woods of Michigan, where he was born May 7, 1857, and later grew to manhood in Cleveland, Ohio. The Packs emigrated from England, and were in Colonial days a New Jersey family; and Mr. Pack, some years since, returned to the State, making his home at Lakewood. He is a member of New Jersey Forest Park Commission.

At the recent meeting of the National Conservation Congress at Indianapolis, Mr. Pack was elected president of the Conservation Congress for the next year—a signal honor richly deserved because of his training, his prominence in the Conservation movement and his long-continued and consistent service. He has been a prominent figure at former congresses, and is keenly alive to their usefulness, principles and possibilities. The Fifth American Conservation Congress is to be congratulated upon its choice of a president. He will undoubtedly do much to increase the usefulness of the organization and to broaden the field of its endeavor.

IN THE HILLS OF OREGON

By J. ALBERT BAKER

Cascade National Forest

IT is a hot day in August. Come take a trip to our friend's homestead in the hills, where the strenuousness of city life is unknown. Is this not a beautiful scene to be reached by a few hours of travel? The horses are weary, so let us ride slowly and enjoy the pleasures of a summer evening in the woods.

At our feet, the unforked wagon road winds its tortuous way along the bank of a brawling mountain stream. The gigantic mast-like firs cast long shadows opposite the rays of the setting sun. No sound is heard save the muffled foot-falls of our slowly moving steeds, the rustle of a bird in the wayside hazel, and the drowsy murmur, coming from the creek far below, of the water as it slips into the deep, cool pool where the Dolly Vardens love to rendezvous. The evening breeze is just starting down stream bringing sweet odors of balsam and pine to our nostrils, so long accustomed to the city's dust.

But what is that smell which brings memories of long past log-rolling days on the farm? Is some one desecrating the sabbath peace of this evening by burning brush? What causes such a cloud of smoke to meet us as we round this protruding hill? Surely a settler's slashing fire would not create so impenetrable a mask over these sylvan beauties!

The shadows of evening have given way to darkness as we enter a deeply wooded stretch of creek bottom. The smoke effectually hides all stars, increasing the gloom until we can no longer see our horses' ears, and must feel to find the saddle-horn. But see that lurid patch far up the road where the timber ceases! A little nearer we come and a whole city seems to be

ablaze. In the foreground, the deserted buildings of an abandoned logging camp cluster near the dense timber, in its gloom, like a brood of young chicks trying to escape the unwonted light.

A few more yards and we are in a logged-over area flooded with light shed by a huge forest fire, which is moving upstream. Here we see the battle-ground strewn with smoldering ruins, as though a devastating army had destroyed a city by the torch. Yonder hill topped with great hollow snags which are belching forth columns of blazing wrath, marks the advance of the fire, where the battle is being waged most fiercely. A huge glare lights up the heavens, disclosing immovable, dark mountains to the right and to the left of the narrow valley, while the crash of falling trees, and the dull thud of their impact with the earth, recalls the days of the logging camp, when the "fallers" were busy. But here is our homesteader's cabin, set in the green oasis of a clover field, safely escaping the ravaging flames. Here we can rest for the night, disturbed only by the distant boom of the falling tree trunks, and the glare of the receding fire.

A few hours of slumber and we are aroused by the clank of shovels and mattocks being thrown to the ground. Savory odors come up from the "lean-to" at the rear of the cabin. We hurry down to find a scene similar to that common in the mess hall of a military station. Around improvised long tables men are seated, washing down hot-cakes and bacon with black coffee, while outside a cavalcade of tired, grimy men just in from an all-night of labor on the fire line, are stretching themselves on their tarpaulins, for rest.

But where is the forest fire? Only an occasional thud is heard as some

unlucky monster crashes down the mountain side; no blaze can be seen save that of the sun which, with dimmed brightness, is trying to pierce the pall of cold smoke. Why is the Forest Ranger so busy instructing his subalterns—the foremen—to take their squads to certain strategic points and renew the attack on an enemy which seems dead?

Let us go with the Ranger as he surveys the field, and disposes his forces where they can best wage the battle. A closer examination of the fire-line shows that the enemy is not dead but only resting and preparing to take up the fight when the time is more opportune for its successful forward march. Observe that line of smoke near the ground, creeping stealthily up the hill, eating its way through decayed vegetation, and occasionally sending a sentinel blaze up a pitchy pine tree to spy on the laborers. Let us stay and watch this wary destroyer, as it gains confidence from the heat of mid-day, hop up into a clump of manzanita brush and crackle with delight.

Just in front of it, the hobo, pressed into service, wields a mattock by the side of a white-handed salesman, who had come to the wilds for a fishing trip. A little farther is the stalwart woodsman, with muscles of iron, swinging one end of a cross-cut saw, while at the other end, the bare head of a college man is in evidence. Why are these men toiling so diligently to construct a trench and clear out an alley in the underbrush?

Hear that roar down the hill! The hot winds from the valley are scurrying to the cool deep woods; the blaze in the manzanita, with a crash through the greasewood, leaps to the canopy-like tops of the conifers and makes for the ridge in leaps and bounds. It comes with a shriek and a crash. Great walls of flame consume the undergrowth and set fire to the dead snags and green timber alike. Clouds of sparks, blown from the snags by a fierce gale, soar high into the air. On every hand new fires are springing up. The men work

like demons, but to no avail. With an impetuous rush, the blazing whirlwind crosses their trench, and they must drop back.

Do they give up the battle as lost? Follow them through the night, as led by the Ranger and strengthened by the night crew, they encircle the fire with a new trench after it has become quiet in the evening. Here the enemy is combatted with his own weapon, when a back-fire started from the new trench meets the main advance, leaving nothing for it to burn. However, the task is not yet done, the victory is not yet won, for the days are hot and the air full of smoke and cinders, emitted from smoldering wooden smoke-stacks that are watching for an opportunity to hurl their incendiary pillagers into the virgin timber, and start afresh the path of devastation. By day and by night the men, with vigilant eye, patrol the firing line keeping the enemy at bay, while day by day the atmosphere grows more like that of the Stygian pit, so that life becomes a horrible nightmare of heat, smoke, burns and toil.

But listen! Whence comes that long, low rumble? Such a rumble as is heard when an enormous herd of cattle is approaching, on the plains. Note how the smoke to the southeast has given way to a dark, lowering cloud. At sight of this, the men drop their tools and make a dash for the lower, open country, hurried on by a cool, damp wind which increases to hurricane speed by the time they reach the clearing. Here the scattered trees groan and hiss as their umbrella tops sweep toward the ground; while from the uncut hill sides comes a tumult as of a storm at sea, drowning all other sounds save the crash of trees, weakened by fire, dashing to the earth with a jolt. The smoke is quickly pushed downstream followed by a sheet of rain which sounds so cool and refreshing as it falls on the shake roof of the homesteader's cabin. Such a sound as brings joy and sleep to the exhausted, heavy-eyed men!

THE EFFECT OF ADVANCING VALUES OF LUMBER AND STUMPAGE ON THE CONSERVATION OF OUR FOREST RESOURCES

By ROBERT FULLERTON

THE value and importance we attach to natural resources is based on their abundance and not on the time or labor cost required in their production or reproduction. The one time supposed limitless area of virgin forest lands in the United States seeded by Mother Nature with no human aid and maturing for centuries on the unexplored, untaxed public domain, was considered of little or no value; a sort of elemental inheritance like water and sunshine, often looked upon as an obstructing, expensive embargo in the civilizing progress of the pioneer homesteader when clearing his land for the cultivation and production of necessary food crops. Some modern industrial critics with little knowledge of early pioneer times, or lacking capacity to rightly understand conditions confronting the homesteader and the lumberman in their strenuous efforts to make a living in the wilderness outposts of civilization, accuse these hard working nation builders of thoughtless predatory vandalism and wanton wastefulness of an indispensable natural resource. Going back to colonial times, the abundance of growing timber in New England was often considered a nuisance; a troublesome hardship to be cut down and burned up to clear the land for farming purposes.

A forest of giant oaks or towering pines is a beautiful sight and fills the eye with delight. But our forefathers, while appreciating the beauty and value of their forest resources, could not subsist on a diet of acorns and pine cones, and the obstructing forest trees had to surrender their first lien to the soil and the sunshine to make room for some food producing crop. The American oak had to make way for the Irish

potato and the pine and the spruce were deadened and destroyed that corn and wheat might grow. Our forefathers slaughtered their forest trees that mankind might live; a survival of the fittest, that calls for no apology from the generations that preceded us.

The first settlers in this country were poor and proverbial for economy; they wasted nothing that seemed to them of value; they came from countries where timber was scarce and highly prized; to cut magnificent groves of pine and oak trees that had been maturing for centuries, and consign their splendid lumber-making trunks to the flames, must have occasioned a feeling akin to sacrilege in the minds of Puritan pioneer homesteaders. No settler at any time ever cut down valuable timber from a spirit of pure rapacity, and no lumberman ever permitted a single log to rot in the woods, if there was any visible or prospective profit in hauling such logs to his mill and converting them into lumber.

This statement does not imply that farmers have not destroyed and wasted much valuable timber, and that lumbermen have not left millions of logs in the woods to rot and burn up, but in every instance where a farmer destroyed obstructing timber, it was done from absolute necessity, and the lumberman left low grade logs to waste in the woods rather than involve himself and his associates in bankruptcy, as the market price obtainable for lumber made from such logs, was less than the labor cost of its production. Lumbermen who own and operate saw mills are more interested in saving and utilizing their forest resources than any altruistic politicians demanding legislation to compel the American people to

practice economy and avoid waste in the management of their business.

When the individual becomes the owner of any resource, it requires no legislation to compel him to take care of his own. Zealous but impractical advocates of conservation, newspaper and magazine muckrakers, political demagogues and insurgent office-seekers, have in late years joined in a chorus of indignation and condemnation of American lumbermen as predatory robber barons, united in law-defying combinations, branded as undesirable citizens, public enemies wasting and exploiting the people's inheritance of forest resources. Consumers of forest products, childlike in their requirements, want to eat their cake and have it too; demanding cheap lumber which means the rapid slaughter of our lumber-making forest trees. Any concerted limitation of the production of lumber to correspond with the demand is looked upon as a crime, a violation of the Sherman anti-conservation law. The cheapest commodity in the United States today is forest trees, suitable for saw logs, the present price of stumpage, whether it be hard wood or soft wood, is only a fraction of what it would cost if the trees had to be grown like any other soil crop.

Twenty-five or thirty years ago, forest trees in this country had only a nominal value and lumber prices were based on the cost of bringing the logs from the woods to the mill and converting them into lumber, the value of the raw material or stumpage being only a few cents per thousand feet. Under such conditions only the large mature trees easily accessible and of good quality were harvested by lumbermen and all inferior or defective logs were left in the woods to rot or add fuel to recurring forest fires. Good lumber was so cheap that low grades could not be sold for the cost of production and freight charges to points of consumption.

The need or importance of conserving our forest resources received little thought or consideration. Timber lands were cheap and abundant. The magnificent forests of the Pacific Coast States

were just being explored, cruised and estimated, revealing a supposed limitless supply of the finest lumber-making trees in the world. The yellow pine of the Southern States was first beginning to attract the attention of northern lumbermen whose stumpage holdings in the white pine forests of Michigan, Wisconsin and Minnesota began to show signs of exhaustion, and a corresponding enhancement in stumpage values. The development of these new forest resources kept lumber cheap. Select timber lands selling at two to five dollars an acre, yielding ten to twenty thousand feet to the acre, made a choice pine or oak tree scaling one thousand feet worth less than fifty cents.

Contrast the nominal value placed on this superb forest tree that had been growing and maturing for a hundred or two hundred years, surviving the hazard of devastating cyclones, insect ravages and destructive forest fires, with the cost of such a tree, if planted by the hands of human foresters, the land on which it grew progressively taxed for a hundred years, the capital invested in the forest farm doubling itself every ten years through interest and taxes compounded. Suppose our forest resources were exhausted and the American farmer, forester or lumberman should undertake to grow forest trees for profit, assuming that lands suitable for forest growth could be obtained for \$5.00 an acre and, allowing \$3.00 an acre for planting and protecting the young trees from fire, he would start with an investment of \$8.00 an acre, the first year. In ten years his investment has doubled by the addition of annual taxes and interest charges compounded. At the end of ten years his investment is \$16.00 an acre. Continuing this calculation, at the end of seventy years, the sons or grandsons of the original planters would find their inherited holdings in growing timber representing an investment of \$1,000.00 an acre; and, suppose the forest crop has now reached sufficient maturity to be manufactured into lumber, having escaped the hazard of fires and cyclones and yielding 20,000 feet of merchant-

able logs to the acre, we find a stumpage cost of \$50.00 a thousand for immature timber grown to order in contrast with a present average stumpage price of \$5.00 per thousand now obtained for giant forest trees that have been seeded and nurtured in Nature's forests since Columbus discovered America.

The above figures reveal the low estimate we place on a natural resource that is fast being exhausted. The consumers of lumber complain at any advance in its price and saw mill owners confronted with annually increasing taxes on their reserves of standing timber, cannot limit their operations. Their stumpage must be cut into lumber and sold at competitive prices to pay taxes, deferred interest and principal on his bonded raw material. Not one lumber manufacturer in a hundred can afford to conserve his forest resources by cutting only the mature trees which would double the cost of logging operations, making his product thus obtained so expensive that no profit would result.

Stumpage values in recent years have steadily increased in value, but even at present prices, forest trees are the cheapest crop that grows out of the ground; cheaper than cotton at two cents a pound or corn at five cents a bushel. Suppose wheat or corn were century plants like pine and oak trees; it would require an adding machine to compute the price of a loaf of bread.

The American people do not realize or fully appreciate the splendid quality and low price at which they have been buying their forest products, demanding clear or high grade lumber for many purposes, when lower grades would economically have served their purpose. Extreme cheapness in any commodity always results in waste and improvidence in its use.

Fifty years ago our western plains were stocked with great herds of buffalo, a nature product, common property, roaming the prairies unowned, costing no man anything for sheltering, care or pasturage, tempting the cupidity of reckless pot hunters to proceed to their wholesale slaughter, the hide and tongue being the only parts

of this valuable animal resource of sufficient value to be profitably transported and sold in competition and substitution of domestic products for a like use. It is hardly believable by the present generation that fifty years ago a full grown buffalo, in prime condition, weighing one thousand pounds, had a less market value than a single porterhouse steak served to-day in any first-class hotel or restaurant.

There is no immediate danger of a serious shortage in our supply of lumber products, but the time has come when conservation of our forest resources demands thoughtful consideration. The National forest reserves should be withdrawn from sale and held in cold storage just as long as privately owned stumpage is cheap and abundant. The present sawmill owners are financially unable to practice effective conservation of their stumpage holdings. Increasing annual taxation of forest lands, and the exceptional nature of lumbering operations, requiring the purchase of extensive timber holdings to provide raw material sufficient to keep their saw mills supplied with logs long enough to justify the investment in building and equipping a modern plant to manufacture lumber, necessitating the owners of saw mills to borrow large sums of money, or bond their reserves of standing timber.

The pressing interest charges, added to the increasing annual taxes on his stumpage holdings, force the continuous operation of the saw mill, and the sale of the product at whatever the market price may be, to furnish means to pay his imperative obligations. This is not a theory but a condition governing the lumber industry, making conservation of privately owned forests impracticable except in rare cases where ample capital enables the operator to cut only the mature trees, preserving and protecting the younger growth, hoping that advancing prices of stumpage will repay him for present loss through his more expensive logging operations.

Human nature shows very little change since the days of Solomon; self interest in large measure still controls

our actions. Conservation of our privately owned forest resources will never become effective until there is a present or prospective profit in practicing conservation. Our National forest reserves, now under legislative control and administration, should be supplemented by the several State governments, as only the Nation or the State can afford to hold forest lands in res-

ervation. The cost of protection and reforestation being borne by all the people, forest lands now held by the State or the Nation should be withdrawn from sale, protected against fire and reserved for future use, following the wise providence of the rulers of Egypt, who in years of plenty stored up their corn against the time of scarcity or famine.

INSECT DAMAGING SPRUCE TREES IN MAINE

BY PROF. JOHN M. BRISCOE

DURING the past summer considerable attention has been directed to an insect which is damaging spruce and fir trees in this State.

Inquiries and specimens of the insect have been received both by the Experiment Station and the Forestry Department of the University of Maine. The specimens were identified as the larvae of the spruce bud-moth (*Tortrix fumiferana*) which injures spruce and fir, and sometimes also hemlock and larch. This insect feeds on the buds and young leaves of spruce and fir chiefly, causing a brown and withered appearance of the infested trees.

About one hundred years ago the spruce trees west of the Penobscot River and along the coast of Maine were badly damaged and many of them killed by the attack of an insect believed to be this same species. Some thirty to thirty-five years ago another outbreak of the spruce bud-moth occurred, lasting four or five years. During this attack also many of the spruces and firs along the coast were injured, and many of these trees while not killed outright by the insects, were, owing to their weakened condition, left as an easy prey to the spruce bark beetles. Dr. A. S. Packard, in a paper written at that time, comments on the depressing and disfigured aspect of the country about Casco Bay, owing to the depredations of this insect. It was not, however, till the spring of 1909 that this

insect again began to attract general attention, first in Pennsylvania, and later in New York and Canada. In 1910 it was much worse in the centres of infestation, and in 1911 it had spread to the coast of Maine, where its work is now attracting much attention. During the past summer the pest was widely distributed over the State, reports having been received from localities in Aroostook, Penobscot, Hancock, and Piscataquis counties, and it very probably occurs in others also.

The insect which is responsible for the destruction is a small caterpillar about three-quarters of an inch in length when full grown. Its head is blackish, the body ranging from pale brown to a rich umber brown, diffused with green, each joint with several conspicuous whitish warts, each with a dark centre from which a single hair arises. The miller or moth is about one-half inch in length, measuring when spread out nearly an inch from tip to tip of wing. The legs, body and hind wings are a glistening umber brown, the fore wings have a ground color of bluish gray, and when freshly emerged marked with several conspicuous blotches and dashes of dark brown to almost black. The eggs are pale green, scale-like, flat beneath and slightly convex above; and are laid soon after emergence of the moth. The insect passes the winter on the trees as very small caterpillars which, as soon

as the new growth starts in the spring, begin to feed on the leaves of the terminal twigs, thus causing the brown and withered appearance of the trees later in the season. These caterpillars stop feeding by the middle of June and transform to the chrysalis or pupa stage in thin webs among the living and dead needles at the ends of the branches, sometimes matted in a nest-like formation, and sometimes more or less suspended from the terminal twigs. By the first of July the adults begin to come out from the chrysalis stage and appear on the wing as small grayish moths, often appearing in vast numbers on the trees and flying toward light. They continue to fly and to deposit their eggs in small greenish masses on the needles of the trees until about the middle of July, when the moths die and disappear. The eggs soon hatch and the young caterpillars become partly grown before the end of autumn, passing the winter among the terminal shoots of the trees, where they remain until the next spring, when the life process is repeated.

There is no practical way of protecting forest trees from the attack of this

insect, but in the case of a limited number of small decorative trees around a residence or in a park, the foliage could be protected by spraying with arsenical solution about the time of the opening of the buds and the appearance of the new growth in the spring. The spray should contain $2\frac{1}{2}$ pounds of arsenate of lead to every 50 gallons of water.

The best information obtainable regarding the seasonal history of this insect indicates that there is no occasion for any great alarm as to its continued presence, or any fear of extensive loss of spruce and fir as a result of its work. The spruce bud-moth has many natural enemies which multiply very rapidly as the Ichneumon and Braconid flies, both of which were, fortunately, very numerous this year in this region. These may be counted on within a few years to reduce the numbers of the pest to a point where the limited amount of damage attracts no attention and does little injury. Since, however, one or more years may elapse before these parasitic enemies of the spruce bud-moth gain control, the destruction of some of the spruce and fir trees in the infested zone is inevitable.

CONSUMPTIVES ON FOREST RESERVE

A NOTEWORTHY plan to establish camps in the State forest reserve where persons convalescing from tuberculosis or threatened with that disease might spend the greater part of the year—spring to fall—and be provided with light work that would place them upon a self-supporting basis was outlined a few days ago before the Wisconsin Anti-Tuberculosis association by E. M. Griffith, the State forester of Wisconsin.

Mr. Griffith, who had been asked to give his views as to how a part of the State's forest reserve of almost a half million acres might be utilized in the fight against the white plague, suggested that the State board of forestry might set aside several thousand acres of land,

including one or more lakes, for the use of those recovering from tuberculosis and of those menaced by the disease. It would be necessary, he stated, for the legislature to make an appropriation, which need not be large, to cover the cost of building shacks for the patients and of providing medical attendance for them.

The forestry board, Mr. Griffith said, might give these patients light work in its nurseries and in planting trees. This work could be so arranged that the strength of none would be overtaxed. For instance, some might work two hours in the forenoon and two hours in the afternoon, some three hours in the forenoon and three hours in the afternoon, and some four hours in the

forenoon and four hours in the afternoon, just as the physicians deemed advisable. The compensation would be something like 15 cents an hour. Those working only four hours a day could earn enough to pay for their board, and those who could do a fair day's work would earn considerably more than their board. The idea, of course, would be not to overwork anybody and to give all time and opportunity for rest and recreation.

In the cases of patients who have recovered from tuberculosis, for instance, those discharged from the State tuberculosis sanatorium at Wales, as cured, there is a necessity for a period of outdoor life. Many suffer a relapse if they return at once to close work in office or to labor in foundry or factory. These relapses are very dangerous. Then again those threatened with tuberculosis need outdoor life at once.

The camps, Mr. Griffith suggested, might be located among the pines, on dry, sandy soil, near the shores of one or two lakes that are not so densely shaded as to shut out the sunlight or to cause dampness. In this way the cures of many could be completed and many would be saved from incipient or threatened tuberculosis.

Another suggestion that Mr. Griffith made was that those who, after spending the summer in the State forest reserve, found that it was so beneficial to their health that they wished to stay longer, could lease small tracts in the State reserve and raise garden truck, chickens, and the like, which would find a ready market at the public resorts and private homes round about.

Physicians who have made a special study of tuberculosis have expressed themselves as strongly in favor of Mr. Griffith's plan. It is not necessary, they state, for persons afflicted or threatened with tuberculosis to leave the State, but they must live out of doors and any opportunity for outdoor life in upper Wisconsin, amid the sand and the pines, would be a great help in curing tubercular patients. Mr. Griffith's plan to shelter them, feed them and give them medical care, and at the same time provide light work that will permit them to be self-supporting, so that they will not be subjected to any real expense and at the same time will not be charity patients, is regarded as a long step forward in the State's fight against tuberculosis.

COMING MEETINGS

Officials of forestry, lumber, timberland and fire protection associations are invited to send to AMERICAN FORESTRY notices of their meetings to be published in this column.

October 29—Third quarterly meeting of Directors of the American Forestry Association, at the Railroad Club, New York City.

November 5—Georgia-Florida Saw Mill Association, Tifton, Ga.

November 13—Lumber Manufacturers' Association of Southern New England, Hartford, Conn.

November 14—Empire State Forest Products Association, Watertown, N. Y.

November 19-21—National Federation of

Retail Merchants, Planters Hotel, St. Louis, Mo.

December 2-3—Western Forestry & Conservation Association, Seattle, Wash.

December 4-6—National Rivers & Harbors Congress, New Willard Hotel, Washington, D. C.

December 7—North Central Missouri Retail Lumber Dealers' Association, Moberly, Mo.

January 21-23—Ohio Association of Retail Lumber Dealers, Cleveland, Ohio.

January 22-24—Southwestern Lumbermen's Association, Kansas City, Mo.

THE PRESENT SITUATION OF FORESTRY*

BY CHIEF FORESTER HENRY S. GRAVES

A REVIEW of the work of forestry in this country during the past year shows that, in many directions, there has been substantial progress and positive achievements. On the other hand, the continued organized attacks on the National Forest system, and the efforts to break it down or cripple it, present a situation of real danger which the country should realize and vigorously meet. We have before us a task of constructive activity in practical work, extending and building on foundations already laid; we have also the task of preventing a destructive attack upon National forestry.

During the past few years public interest in forestry has been rapidly changing from a mere inquiry in regard to its purpose to a vigorous demand for practical results. This more intelligent public sentiment is now finding its expression in a growing appreciation of the need of better forest laws, greater State appropriation for fire control, and increasing interest in forest protection by private timberland owners. It often happens that public attention is caught only by the most striking new departures and developments, such as a change in public policy or important legislation, while but little is known of the steady advance in applied forestry. The past year has been signalized not so much by new undertakings as by marked accomplishment in the effective carrying out of work previously inaugurated.

PROGRESS IN NATIONAL FORESTRY

Every year shows increased efficiency in the administration of the National Forests. The most conspicuous advance has been in organized fire protection. The disastrous year of 1910 taught many lessons. While that disaster could not have been avoided in the ab-

sence of better transportation and communication facilities and without a larger patrol force than the Forest Service could put into the field, it nevertheless showed how, even under the present conditions, the work of protection could be made more effective. Full use was made of the experience gained in that year, and during the past two seasons the loss by fire has been kept down to a comparatively small amount through the efficient system now in force. The problem, however, of fire protection on the National Forests is far from being solved. There still remain to be built some 80,000 miles of trails, 45,000 miles of telephone lines, many miles of roads, many lookout stations, and other improvements, before even the primary system of control will have been established. The funds at the disposal of the Forest Service are still inadequate to employ the patrolmen needed to meet more than an ordinary emergency. There is even yet danger, therefore, that in the case of a great drought, like that of 1910, some fires might gain the mastery and a similar disaster follow.

An account of the progress of the work of the Forest Service in the administration of the National Forests would be an enumeration of the different activities in which the work is going on with constantly growing effectiveness. Many of the local difficulties of administration are rapidly disappearing. This is due to the steadily closer co-ordination of the interests of the Government with those of the people living in and using the Forests. More and more these people are coming to appreciate that their interests and those of the National Forests are one. With a better understanding of the aims and methods of the Forest Service, local difficulties are disappearing and local support of the Service is largely replac-

ing opposition. Those who are aiming to destroy the National Forest system are not the settlers and others who use the Forest, but rather men who seek for their own advantage special privileges to which they are not entitled, and who wish to acquire, for little or nothing, valuable resources for speculation and personal gain.

During the past year the Weeks Law, authorizing the purchase of lands on navigable streams, has been put into effect, and the Government has already entered into contracts for the purchase of 230,000 acres in the Southern Appalachian Mountains, and about 72,000 acres in the White Mountains. These lands are being secured on the most desirable areas, and it has been possible to obtain them for reasonable prices. A special feature of the Weeks Law is the co-operation between the Government and the States in fire protection on watersheds of navigable streams. The law provides \$200,000, until expended, for such co-operation; but this money can be used only in States which have already inaugurated a system of fire protection under public direction. During the year ending 1911 there were 11 States which qualified under this law, receiving in the aggregate about \$40,000. During the current year sums varying from \$1,500 to \$10,000 have been allotted to the States of Maine, New Hampshire, Vermont, Connecticut, New York, New Jersey, Maryland, Wisconsin, Minnesota, Oregon, and Washington. There is still sufficient money left from the original appropriation for substantial co-operation during another year. It has been the aim of the Forest Service to spread the money over three years in order that there may be a full demonstration of what can be accomplished and at what cost. It will then be possible to present to Congress a satisfactory basis upon which to consider whether Federal aid to the States should be continued.

The most urgent need of the National Forest work is more ample provision of the funds necessary for adequate protection of the Forests against fire. It is especially urgent that the work of constructing roads, trails, telephone lines,

and other improvements needed for fire protection be extended much more rapidly than at present.

PROGRESS IN STATE FORESTRY

A very great obligation rests upon the State governments in working out the problem of forestry. Organized fire protection under State direction, the establishment of a reasonable system of taxation of growing timber, honest and conservative management of State forest laws, education of woodland owners to better methods of forestry, and such practical regulation of handling private forests as may be required for the protection of the public, are problems which require the immediate action of all States.

While no State is as yet accomplishing all that it should, a number of them are making very rapid progress, and are giving as liberal money support as perhaps could be expected under the present conditions. The feature of State forestry which stands out most strongly is that a number of States have gone beyond merely passing forest laws, and have begun to provide the funds necessary to achieve practical results. At last it is beginning to be recognized that the prevention of fire is the fundamental necessity, and that this can be accomplished only through an organized public service. In order to make laws effective, there must be adequate machinery to carry them out. The fundamental principle of fire protection is preparation. A forest region must be watched for fires, both to prevent their being started and to reach quickly and put out such as from one cause or another may get under way. The new State legislation recognizes this need, and already there has been inaugurated a measure of watchfulness in the season of greatest danger, through patrol or lookouts under State direction. During 1911, which was a banner year in the enactment of State legislation, laws related chiefly to fire protection were passed by Connecticut, Massachusetts, Minnesota, New Hampshire, New Jersey, Oregon, Washington, and Wisconsin; while Colorado created the office of

State Forester. Since the beginning of 1912 Maryland and New York have amended their forest laws, and Kentucky has passed its first complete law.

It is exceedingly gratifying that substantial progress is now being made in the South. Unfortunately, however, none of the Southern States, except Maryland, has hitherto been able to

qualify to receive Federal aid and fire protection under the Weeks Law. It is hoped that during the coming year progress will be made in those Southern States in which practically nothing has yet been done.

*From a paper read to lumbermen and foresters at the National Conservation Congress, Oct. 3.

FOREST AREA LARGELY INCREASED

THE President has issued a proclamation making alterations in the Superior National Forests boundaries, the net result of which is to increase the gross area of the Forests from 910,000 to 1,276,100 acres. The corrected boundary includes 380,555 acres of new land, while it eliminates 14,455 acres previously included.

The Superior National Forest lies in the northeastern corner of Minnesota, between Lake Superior and the Canadian line. At present it contains little timber of merchantable size, practically all of the original stand having been removed or destroyed by fire before the National Forest was created. The Government is, however, holding and protecting the land for the sake of the future yield of timber which it will produce under forestry methods.

Practically none of the land has any agricultural value, and unless used to grow trees it must remain a mere waste. To grow timber it must be protected from fire. The areas now added are in general character similar to those previously embraced within the Forest, and will be protected and administered along the same lines.

The eliminated portions are made up

principally of private holdings and contain too small an amount of land suitable for forest purposes to make it worth while for the Government to retain the areas in the Forest. Throughout the Superior Forest the percentage of alienated land is heavy, and the same is true of the portions newly included, so that the amount of Government-owned land added to the Forest is much less than the gross area figures would indicate.

Under the proclamation the eliminated lands are withdrawn for classification, following which they will be restored to settlement and entry by the Secretary of the Interior after such notice as he may deem advisable and as he may determine this course to be compatible with the public interest.

There is one other National Forest in Minnesota, called the Minnesota and situated at the headwaters of the Mississippi, about Lake Winnibigoshish. It contains about 295,000 acres, and was created from Chippewa Indian lands after the virgin timber had been cut off under forestry regulations. In consequence it has a much more promising growth of young pine and Norway pine than has the Superior at the present time.

THE EUCALYPTUS

BY HARRY D. TIEMANN

EUCALYPTUS for California is a proposition worthy of hearty endorsement, but it should stand upon its own merits and not upon some fictitious attributes. Otherwise vast disappointment and losses to the hundreds of small investors who are counting upon the Eucalyptus as a timber producing tree are in store. In your July number appears an interesting article upon San Diego's Municipal Forest. The statement is there made that "Eucalyptus is an acceptable substitute for almost any of our American hardwoods." In the same issue there appears a news note entitled Fast Growing Eucalyptus, to which has been subjoined apparently by the editor a comment that "it is almost unbelievable that trees growing so rapidly produce a timber as hard and tough as hickory." Unquestionably these statements have been made in all good faith, but evidently without a first-hand knowledge of the kind of lumber which these quickly growing trees less than half a century old will produce. As this lack of understanding is very general and is likely to lead to serious consequences, I would like, Mr. Editor, with your assistance, to sound a note of warning, since I have had considerable experience in drying the wood from these trees.

While much that has been claimed as to the marvelous growth of this tree is indeed true, the rapid growing species, particularly the blue gum, *E. globulus*, which is the one of most consequence *is not to be considered a timber producing tree* during its early life of thirty or forty years, for reasons about to be given. It is true that the old trees of Australia which are of great age and size produce lumber of good quality which can be seasoned and utilized as other hardwood lumber, but not so with the young trees such as are growing in California, less than forty years old.

This is just where the fallacy in the arguments of the eucalyptus promoters comes in. The trees actually produce in volume of green wood what is claimed, but only a very small portion of this is convertible into useful lumber. The main troubles with the wood are first, that the trees themselves while living contain internal stresses, which cause the logs to check as soon as the tree is cut, and the boards to warp directly from the saw. Then in drying the shrinkage is not only very unequal, but it is three or four times as great as hickory, and unlike other hardwoods, it begins to shrink with the first loss of moisture as high as eighty per cent of the dry weight. Moreover the dry wood will not hold its shape well. In air drying the wood either checks badly, honeycombs, or warps, generally all three. Small specimens and occasionally a larger piece of lumber, and very carefully selected material have dried successfully, but this represents so small a proportion of the standing timber that the profit is gone. In some experiments in drying this lumber in a special kiln of my own invention I have succeeded in turning out some really fine boards which will compare favorably with oak and other hardwoods, but it must be remembered that this represents selected material, and probably from less than one per cent of the standing trees, and even so less than half of the scale measure of the logs from which cut. For small articles such as tool handles good material can be had by selection, and some concerns in California are now manufacturing these, but the market for this material is necessarily limited and such small stock does not require a very great stumpage.

Mr. Watson in his article does not state what species he is planting at San Diego. It is possible that some of the slower growing eucalypts, the value of

which for lumber has not been tried, such as *E. resinifera*, might prove good, but then on the other hand their rates of growth are so slow as to be of little or no advantage over other hardwoods.

This matter should be made very plain for the benefit of the great number of people who are investing in eucalyptus planting. For fuel, wind-

breaks, and soil protection, as well as for many other purposes, the value of Eucalyptus trees for California can hardly be over-estimated, but the fictitious claims which are sometimes made for the blue gum and other species as a lumber producing tree in less than half a century of growth should be refuted so clearly that "he that runs may read."

NEW PLAN OF SEED EXTRACTION FROM PINE CONES

THE Forest Service is experimenting with new ways of extracting the seed from the pine cones cheaply and efficiently. The policy is to collect seed in good seasons and in localities where an abundant crop has been produced. Thousands of bushels are gathered in one place and from these the seed has in the past been extracted by the slow process of heating the cones artificially to make them expand, when the seed is shaken out, collected, and cleaned. When conducted in the winter on a large scale the work is greatly delayed by the difficulty of securing plenty of hot air, and at the same time keeping it dry. The cones give off their moisture and soon surcharge the air to saturation and the admittance of fresh air lowers the temperature below the point of effectiveness. For these reasons the capacity of even large plants is usually limited to turning out from one hundred to one hundred and fifty bushels per day.

During the last season the Service has been experimenting with modifications of a grain threshing machine and has been successful in District 1 this summer in threshing white pine seed from the cones when the latter were partially dry. It is thought that by further modifying an arrangement of the teeth in the cylinder seeds may be successfully threshed from cones like yellow pine, Douglas fir, and even lodgepole pine. If this proves possible the capacity of a seed extracting plant can be increased to ten times its former output. The chief difficulty to overcome is the cracking and spoiling of the seeds during the process of threshing. A small experimental plant on the Kaniksu National Forest was installed this spring and produced results which are greatly encouraging. Very little harm was done to the seed and the cones were handled at the rate of one thousand bushels per day where formerly one hundred and fifty bushels was a good day's work.

JAMAICA'S FOREST WEALTH

Recently the first cargo of hardwood timber shipped from Jamaica to the United States was forwarded from Port Antonio. This timber was bought by an agent from New York and consisted of mahogany and cedar trees. Two shipments have thus far been made and other shipments are said to be contemplated. Although lumber does not comprise any considerable part of Jamaican exports, some shipments of hardwood timber have been made from Kingston for a number of years, chiefly to European ports. A body of something like 35,000 acres of forest land is in the parish in which Port Antonio is situated, and the government is building roads for the development of this timber. The land is part of a purchase made by the government from an improvement company which originally received the land as part of a railway grant. The entire island is said to contain 400,000 to 500,000 acres of forests.

THE MANURING OF FOREST TREES

BY ARTHUR SMITH

DURING the past quarter of a century the question of manuring forest trees has been given considerable attention in Europe, and, among other experiments, that of using sewage effluent has been tried.

Near Berlin irrigating a forest of trees having considerable size by a monthly application of sewage water during two growing seasons was a decided failure and it caused the death of many of the trees. A similar irrigation at Gerlitz gave better results. In this case, however, the growth was considerably younger. The city of Berlin has obtained encouraging results by top dressing the soil of coniferous woods with city refuse.

In view of the long period between the planting and the cutting of a forest the direct application of manure in any form is not likely in a general way to prove remunerative. At the same time the question of helping along a plantation of young trees, especially conifers, is worth considering and in the earlier stages in the life of forest trees growing in poor soil the value of some form of manuring may possibly become an acknowledged fact in practical forestry.

For instance on poor sandy soils where the nitrogen content is very small the problem of supplying this necessary plant food in a slowly available form is worthy of consideration. The idea of applying nitrates or other commercial forms of nitrogenous fertilizers may be put aside as impracticable both on account of cost and because they are too rapid in action, besides causing an excessive growth of weeds. Making use, however, of atmospheric nitrogen by growing on the land some form of the Leguminosæ appears to be feasible an deworthy of trial. Upon some sandy soils in Europe lupins have been used for this purpose and good results are reported. Lupins would scarcely be so

suitable for this country as some of the clovers, such as the White Clover, *Trifolium repens* and Alsike, *Trifolium hybridum*. An ideal method would be to plow in a crop of clover the season previous to planting, then sow clover again and plant the trees in the young clover. Failing, this clover could be broadcasted over the ground in the spring. To obtain a stand of clover upon the more sandy soils the application of some form of lime would be obviously necessary.

It is of course well known that the amount of mineral matter retained in lumber is comparatively small, and, by the fall of their leaves, trees during their growth return to the soil the greater part of the mineral matter taken from it; this applies, however, more to deciduous species than to conifers. But the main point to be considered is that of giving young newly planted trees a good start and helping them along during the first few years of their life, when they have the greatest struggle for existence. It is in this connection that the value of giving the soil some previous preparation upon the lines suggested above comes in—of course where it is practicable—as not only is plant food added to the soil in a slowly available form but, what is of the greatest importance, the early growth is accelerated, being measured by feet instead of inches.

Another means which works to the same end and which is more applicable to the heavier classes of soils is that of keeping the ground in clean cultivation during the first two or three years of the trees' growth. During the past season the writer has kept about 8,000 two-year-old conifers under clean cultivation and another block of 5,000 has only had the weeds out and left lying. The soil of the latter is, if anything, better than the former, but the growth

of the block cultivated has been more than double as much as that uncultivated. At the end of July, one more cultivation was given and Crimson Clover sown at the same time.

Of course it goes without saying that this more intensive system of forestry is impossible everywhere or upon a large scale of forest planting involving many thousands of acres of mountain land, and, at the best, planting is generally done upon land that is more or less uncultivable. At the same time I believe that new plantings should have generally more care given to them than is usually the case, especially upon private estates and farmers' wood lots.

There are many situations where some methods of assisting young trees to get a good start are practicable and therefore desirable, and which would, I believe, be in the long run profitable. The conditions connected with the first few years of a tree's life have a tremendous influence upon the subsequent results, both in the period when it is fit to be turned into lumber and money, and in the number of board feet which will be produced in a given time.

If a comparatively small expenditure along the lines suggested will accelerate the one and increase the other in the same time, as I feel sure it would, then surely it is worth while.

FOREST SERVICE AFTER FRUIT PEST

ACTING quickly on the instructions of Congress embodied in the bill recently passed by both houses providing an appropriation of \$35,000 to enable the Federal Government to assist the fruit interests of California to prevent the importation of the Mediterranean fly into that State, the Department of Agriculture has sent Charles Lester Marlatt, assistant chief entomologist for the department, to Hawaii to inspect conditions there. While in the islands Marlatt will make arrangements to take over the Hawaiian inspection service to prevent the importation of the pest to California, or perfect the organization of a Federal inspection service to co-operate with the Territorial authorities.

Marlatt said before starting that the Department of Agriculture was anxious and determined to establish an inspection service over all fruits leaving the islands, to guard against the exportation of the dreaded Mediterranean fly

or any other fruit pests, and that this service would be made as effective and thorough as the funds allowed for the purpose by Congress would permit. Marlatt thinks that he will be able to hit upon a feasible plan of uniting the efforts of the National Government with the fruit inspection service already in operation, and which is provided at the expense of the California fruit-growers. If this tentative proposal proves unacceptable, he will organize a separate Federal bureau.

The selection of Marlatt for this work has given general satisfaction among the California fruit-growers, as he is acknowledged to be one of the highest authorities on entomology in the Government service. He has been with the Department of Agriculture since 1889, and in 1901-02 made an entomological trip for the department to Japan, China and Java and other islands in the Malay Archipelago.

MAHOGANY FOR CANADA

THE enormous increase in building operations throughout Canada has been instrumental in creating imports into this country of mahogany which some 10 or 15 years ago would never be expected to be imported, according says Captain H. C. Johnson, of Kingston, Ont. Mahogany has become an article of demand in the construction of new buildings and the new mahogany being used in the early growth of the country has become a scarce article with the result that the mahogany being imported is almost entirely mahogany from foreign and domestic sources. During the building boom which has been going on throughout the country mahogany is very valuable and in fact is almost every where scarce in connection with the building boom for the heavy mahogany used for construction of steel mahogany cases.

That Canada is now consuming in the building boom more in mahogany than in the importation of mahogany, though this is the greatest market in the world, the fact remains that no wood grows here and is used in manufacturing wood work. That fact is Canada's chief export, that of lumber, and for mahogany and steel mahogany for construction and for mahogany for furniture mahogany is becoming scarce and in the last few years large amounts of this wood have been imported from the United States and have opened markets in Canada.

The mahogany of Canada which has increased tremendously per capita, has

greatly aided the more luxurious living. Canada now uses the best of furniture in the house might be made of any hard wood grown here with a perfect finish while now nearly everything must be imported. The wood in the house being used is mahogany, being in large quantities of 10,000 or 20,000 or 30,000 or 40,000 or 50,000 or 60,000 or 70,000 or 80,000 or 90,000 or 100,000 or 110,000 or 120,000 or 130,000 or 140,000 or 150,000 or 160,000 or 170,000 or 180,000 or 190,000 or 200,000 or 210,000 or 220,000 or 230,000 or 240,000 or 250,000 or 260,000 or 270,000 or 280,000 or 290,000 or 300,000 or 310,000 or 320,000 or 330,000 or 340,000 or 350,000 or 360,000 or 370,000 or 380,000 or 390,000 or 400,000 or 410,000 or 420,000 or 430,000 or 440,000 or 450,000 or 460,000 or 470,000 or 480,000 or 490,000 or 500,000 or 510,000 or 520,000 or 530,000 or 540,000 or 550,000 or 560,000 or 570,000 or 580,000 or 590,000 or 600,000 or 610,000 or 620,000 or 630,000 or 640,000 or 650,000 or 660,000 or 670,000 or 680,000 or 690,000 or 700,000 or 710,000 or 720,000 or 730,000 or 740,000 or 750,000 or 760,000 or 770,000 or 780,000 or 790,000 or 800,000 or 810,000 or 820,000 or 830,000 or 840,000 or 850,000 or 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1,650,000 or 1,660,000 or 1,670,000 or 1,680,000 or 1,690,000 or 1,700,000 or 1,710,000 or 1,720,000 or 1,730,000 or 1,740,000 or 1,750,000 or 1,760,000 or 1,770,000 or 1,780,000 or 1,790,000 or 1,800,000 or 1,810,000 or 1,820,000 or 1,830,000 or 1,840,000 or 1,850,000 or 1,860,000 or 1,870,000 or 1,880,000 or 1,890,000 or 1,900,000 or 1,910,000 or 1,920,000 or 1,930,000 or 1,940,000 or 1,950,000 or 1,960,000 or 1,970,000 or 1,980,000 or 1,990,000 or 2,000,000 or 2,010,000 or 2,020,000 or 2,030,000 or 2,040,000 or 2,050,000 or 2,060,000 or 2,070,000 or 2,080,000 or 2,090,000 or 2,100,000 or 2,110,000 or 2,120,000 or 2,130,000 or 2,140,000 or 2,150,000 or 2,160,000 or 2,170,000 or 2,180,000 or 2,190,000 or 2,200,000 or 2,210,000 or 2,220,000 or 2,230,000 or 2,240,000 or 2,250,000 or 2,260,000 or 2,270,000 or 2,280,000 or 2,290,000 or 2,300,000 or 2,310,000 or 2,320,000 or 2,330,000 or 2,340,000 or 2,350,000 or 2,360,000 or 2,370,000 or 2,380,000 or 2,390,000 or 2,400,000 or 2,410,000 or 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3,190,000 or 3,200,000 or 3,210,000 or 3,220,000 or 3,230,000 or 3,240,000 or 3,250,000 or 3,260,000 or 3,270,000 or 3,280,000 or 3,290,000 or 3,300,000 or 3,310,000 or 3,320,000 or 3,330,000 or 3,340,000 or 3,350,000 or 3,360,000 or 3,370,000 or 3,380,000 or 3,390,000 or 3,400,000 or 3,410,000 or 3,420,000 or 3,430,000 or 3,440,000 or 3,450,000 or 3,460,000 or 3,470,000 or 3,480,000 or 3,490,000 or 3,500,000 or 3,510,000 or 3,520,000 or 3,530,000 or 3,540,000 or 3,550,000 or 3,560,000 or 3,570,000 or 3,580,000 or 3,590,000 or 3,600,000 or 3,610,000 or 3,620,000 or 3,630,000 or 3,640,000 or 3,650,000 or 3,660,000 or 3,670,000 or 3,680,000 or 3,690,000 or 3,700,000 or 3,710,000 or 3,720,000 or 3,730,000 or 3,740,000 or 3,750,000 or 3,760,000 or 3,770,000 or 3,780,000 or 3,790,000 or 3,800,000 or 3,810,000 or 3,820,000 or 3,830,000 or 3,840,000 or 3,850,000 or 3,860,000 or 3,870,000 or 3,880,000 or 3,890,000 or 3,900,000 or 3,910,000 or 3,920,000 or 3,930,000 or 3,940,000 or 3,950,000 or 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8,580,000 or 8,590,000 or 8,600,000 or 8,610,000 or 8,620,000 or 8,630,000 or 8,640,000 or 8,650,000 or 8,660,000 or 8,670,000 or 8,680,000 or 8,690,000 or 8,700,000 or 8,710,000 or 8,720,000 or 8,730,000 or 8,740,000 or 8,750,000 or 8,760,000 or 8,770,000 or 8,780,000 or 8,790,000 or 8,800,000 or 8,810,000 or 8,820,000 or 8,830,000 or 8,840,000 or 8,850,000 or 8,860,000 or 8,870,000 or 8,880,000 or 8,890,000 or 8,900,000 or 8,910,000 or 8,920,000 or 8,930,000 or 8,940,000 or 8,950,000 or 8,960,000 or 8,970,000 or 8,980,000 or 8,990,000 or 9,000,000 or 9,010,000 or 9,020,000 or 9,030,000 or 9,040,000 or 9,050,000 or 9,060,000 or 9,070,000 or 9,080,000 or 9,090,000 or 9,100,000 or 9,110,000 or 9,120,000 or 9,130,000 or 9,140,000 or 9,150,000 or 9,160,000 or 9,170,000 or 9,180,000 or 9,190,000 or 9,200,000 or 9,210,000 or 9,220,000 or 9,230,000 or 9,240,000 or 9,250,000 or 9,260,000 or 9,270,000 or 9,280,000 or 9,290,000 or 9,300,000 or 9,310,000 or 9,320,000 or 9,330,000 or 9,340,000 or 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10,110,000 or 10,120,000 or 10,130,000 or 10,140,000 or 10,150,000 or 10,160,000 or 10,170,000 or 10,180,000 or 10,190,000 or 10,200,000 or 10,210,000 or 10,220,000 or 10,230,000 or 10,240,000 or 10,250,000 or 10,260,000 or 10,270,000 or 10,280,000 or 10,290,000 or 10,300,000 or 10,310,000 or 10,320,000 or 10,330,000 or 10,340,000 or 10,350,000 or 10,360,000 or 10,370,000 or 10,380,000 or 10,390,000 or 10,400,000 or 10,410,000 or 10,420,000 or 10,430,000 or 10,440,000 or 10,450,000 or 10,460,000 or 10,470,000 or 10,480,000 or 10,490,000 or 10,500,000 or 10,510,000 or 10,520,000 or 10,530,000 or 10,540,000 or 10,550,000 or 10,560,000 or 10,570,000 or 10,580,000 or 10,590,000 or 10,600,000 or 10,610,000 or 10,620,000 or 10,630,000 or 10,640,000 or 10,650,000 or 10,660,000 or 10,670,000 or 10,680,000 or 10,690,000 or 10,700,000 or 10,710,000 or 10,720,000 or 10,730,000 or 10,740,000 or 10,750,000 or 10,760,000 or 10,770,000 or 10,780,000 or 10,790,000 or 10,800,000 or 10,810,000 or 10,820,000 or 10,830,000 or 10,840,000 or 10,850,000 or 10,860,000 or 10,870,000 or 10,880,000 or 10,890,000 or 10,900,000 or 10,910

IMPORTANT MEETING OF DIRECTORS

ONE of the most important meetings of the directors of the American Forestry Association in some years, was held at the Railroad Club, 30 Church St., New York, on Tuesday, Oct. 29, there being present Chester W. Lyman, who presided; Col. W. R. Brown, of Berlin, N. H.; Prof. H. H. Chapman, of Yale; John E. Jenks, of Washington, D. C.; Otto Luebker, of Washington, D. C.; Charles Lathrop Pack, of Lakewood, N. J.; Thomas Nelson Page, of Washington, D. C.; C. F. Quincy, of New York City; E. A. Sterling, of Philadelphia; Frederick S. Underhill, of Philadelphia; Capt. J. B. White, of Kansas City, Mo.; John L. Weaver, of Washington, D. C., and P. S. Ridsdale, executive secretary of the Association.

The chief matter discussed was a tentative plan for co-operative work by the American Forestry Association and the committee appointed by the forestry section of the Fourth Conservation Congress held Oct. 1-4 at Indianapolis. The delegates of the Association who attended the Conservation Congress, reported in chief, as follows:

"An unusual opportunity has come to the American Forestry Association to do constructive work which will not only further the general cause but strengthen the Association and make it a power and influence in academic and practical forest work. It is a chance to continue the general forest propaganda more effectively and at the same time work definitely towards the solution of the more important specific problems.

"At the several informal meetings of the lumbermen and foresters in attendance at the Fourth Conservation Congress at Indianapolis, October 1 to 4, the question of more definite work throughout the year was thoroughly discussed. Two distinct lines of activity seem advisable: The first is arranging the program of the Conservation Congress sessions, so as to give more promi-

nence and publicity to forest problems. The second involves the appointment and guidance of standing committees, which shall report to a forestry section of the Congress on definite problems relating to forestry and lumbering.

"The representatives of the American Forestry Association present volunteered the services of their organization in furthering this work in co-operation with a committee made up of E. T. Allen, Captain J. B. White and H. S. Graves, which was appointed to represent the private and government timber interests. This latter committee represents the organized timberland owners and Forest Service, and it was not until the Indianapolis meeting that they came to realize the strong influence the rejuvenated American Forestry Association, as a national body, could and will exert in the solution of problems of mutual interest.

"The most important feature of the proposed organization is the appointment of standing committees for the investigation of matters of vital importance to the lumbermen, timberland owners and foresters.

"In the choice of men to serve on the committees and on the plan of following up their work and securing definite action will depend the success of the plan. It is the thought to appoint men best qualified to handle the various subjects, regardless of their affiliations.

"Following the practice of other organizations which work with standing committees, it is suggested that at least one complete report on one of the definite subjects assigned be submitted each year, and the other subjects covered by progress reports. It would be optional with the committee which subject to place the most emphasis on. New subjects would be assigned from time to time.

"A committee appointed at the Conservation Congress, comprised of E. T. Allen, J. B. White and H. S. Graves, is

already in existence. Another committee, representing the American Forestry Association and made up preferably of members of the Executive Committee, should be appointed. This committee should have a secretary or chairman to assist the Secretary of the Association in the technical work relating to the standing committees, or to work directly with the chairman of the other committees."

The delegates suggested a tentative list of subjects for investigation, and some names of committeemen, and the subjects, and the committees having them in charge will be announced after the two committees meet.

Following a long discussion of the proposed work, and a hearty endorsement of the plan by all the directors, Chairman Lyman appointed a committee of three members of the executive committee to take charge of the investigative work for the Association, and

confer with the committee appointed at the Conservation Congress. This committee comprises Charles Lathrop Pack, Col. W. R. Brown and E. A. Sterling.

The opinion was generally expressed that the work should lead to securing definite results of a practical nature and will materially aid in securing the closer co-operation of lumbermen and foresters, and a decided extension of the work of the Association. It was decided that Executive Secretary Ridsdale shall attend the annual meeting of the Empire State Forest Products Association at Watertown, N. Y., on Nov. 14; and that Governor Robt. P. Bass, E. A. Sterling and P. S. Ridsdale attend the annual meeting of the Western Forestry and Conservation Association at Seattle on Dec. 2 and 3.

It was also decided to hold the annual meeting in Washington, D. C., in January at some date to be decided later.

UNIFORM STANDARDS FOR STATE FORESTRY

IN the May number of AMERICAN FORESTRY mention was made in these columns of the Conference of New York State Departments interested in Forestry, which was held at Albany on April 10th. The Conference appointed a Committee on Standards to consider uniform standards which should be employed in connection with State work in forestry in New York. The object of this was to secure uniform methods in all forestry work which might be done within the State, in order that the results might be readily co-ordinated, even though they might be secured by different departments. The personnel of the Committee on Standards is as follows:

Dean Hugh P. Baker, State College of Forestry, Syracuse University, Syracuse, N. Y., Chairman.

Prof. Walter Mulford, Cornell University, Ithaca, N. Y.

Wm. G. Howard, Asst. Superin-

ent of State Forests, Conservation Commission, Albany, N. Y.

The Committee held meetings in May and June, and also one on October 26th, at which the questions pertaining to the standardization of forest mapping were considered. The Committee held it desirable to retain the forms and symbols employed by the Forest Service, insofar as these forms and symbols might be applicable to conditions in New York State. It was deemed advisable to use the following standards for all forest mapping work within the State. The following specifications were made up:

Forest Maps. Types to be indicated by colors. Eight forest types have been outlined to include all the forests within the State. In cases where it is not feasible to indicate types by colors, a system of hatchure may be employed. The stand of timber to be designated by the alpha-numerical system, placing within each type a circle, inside of which the

name of the species will be indicated by letters, and the quantity of forest products of that species by numbers.

It is expected that considerable benefit will be secured and that duplication

of work will be avoided by the introduction of the standard methods in mapping within the State. The Committee intends, at an early date, to consider the questions of standard forms to be used in forestry work.

AN APPRECIATION

The *Lumber World Review* of Chicago in an article headed "A Remarkable Number for Lumbermen" says of the October issue of AMERICAN FORESTRY:

"The October issue of the magazine, AMERICAN FORESTRY, formerly named CONSERVATION, and published by the American Forestry Association, Washington, D. C., is one of the most remarkable issues of any periodical for the perusal of lumbermen that has come to hand for many years. Space will not permit more than a brief reference to these interesting articles, but lumbermen who devote any attention to these subjects, and nearly all lumbermen do, should purchase this number before the edition is exhausted, in order to secure the benefit of the splendid articles contained therein. One of the most important of these interesting writings is the first article in the magazine entitled, 'Why Do Lumbermen Not Apply Forestry?' This is written by Dr. B. E. Fernow, formerly Forester of the United States and now a member of the faculty of the University of Toronto, Ont. The next article is by George M. Cornwall, editor of the *Timberman*, Portland, Oregon, on 'Logging Engineering.' This excellent article has been printed in the *Lumber World Review* within recent time. E. A. Sterling, President of the American Wood Preservers' Association, whose writings have frequently adorned these columns, has an interesting discussion on the subject, 'Wood Preservation as a Factor in Forest Conservation.' E. T. Allen, Forester of the Western Forestry & Conservation Association, of Portland, Oregon, some of whose articles have already appeared in this journal, treats on 'Method of Forestry Campaigning.' Mr. Allen also contributes a poem entitled 'The

Fire Bug and the East Wind.' Henry E. Hardtner, President of the Louisiana Forestry Association, writes on the subject, 'South's Timber Disappearing.' George H. Holt, of Chicago, head of the Holt Lumber Co. and American Lumber Co., discusses the subject, 'Is Lumber a Crime?' and devotes special attention to the discrimination made lately in some quarters against wooden shingles. Jerome H. Sheip, a prominent lumberman and box manufacturer of Philadelphia, Pa., has an interesting article on 'American Forestry.' Fred R. Fairchild, of Yale University, treats on 'Forest Tax Legislation.' Frederick S. Underhill, of Wistar, Underhill & Nixon, leading lumbermen of Philadelphia, Pa., takes as his text 'The Price of Forest Products,' and quotes a member of Congress as stating: 'I want the duty on lumber reduced that the mechanic may build his home cheaper.' Mr. Underhill says that the Payne-Aldrich bill reduced the duty on lumber from \$2 to \$1.25, and the price of lumber is much higher instead of lower. Thornton A. Green, of Munising, Mich., President of the Northern Forest Protective Association and prominent in lumber manufacture, contributes an article on 'Put Your Camp Fire Out,' and gives samples of the advertising undertaken by the association to prevent damage to the forests through fires. P. F. Cook, associate editor of the *St. Louis Timberman*, writes an unusually interesting article on the 'Social Side of Lumber Life.' C. B. Sweet, of Kansas City, Vice President of the Long-Bell Lumber Co., describes the 'Long-Bell Experimental Farm,' located near Bon Ami, La. Other shorter articles, containing important information for lumbermen and timber owners, abound in this issue."

A NEWLY FOUND TIMBER AREA

Away up in the northern part of Canada, somewhere around what is known as Spirit Lake, the Canadian Government reports an area of 2,400 square miles on which timber three to four inches in diameter is growing. The rangers report that this area has been covered several times with forests which have been burned off. The present stand of timber has grown up since the last fire. If this area can be protected from flames a large population and an immense lumber industry will spring up in that country after the forests now growing have become large enough for manufacturing. Some of the area has merchantable timber growing in protected places, the soil is deep and can always be counted upon to grow another crop of trees if the fires are kept out.

QUESTIONS AND ANSWERS

New Rochelle, N. Y.

EDITOR AMERICAN FORESTRY.—I am contemplating the purchase of a ten-acre eucalyptus grove in the vicinity of Clay, Sacramento County, California. The price is \$200 per acre, 10 per cent down and the remainder in monthly instalments of \$20. The company plants the trees and takes care of them for ten years, when they are to be marketed. Five hundred trees to the acre; and no interest on deferred payments nor taxes to be paid by purchaser. The company estimates that ten acres will produce 100,000 feet of lumber in ten years. Is this correct? Is there a good market for eucalyptus at the present time, and at what price does it sell for M? Kindly give me your opinion as to the desirability of this purchase as an investment for a person of moderate means.

WILLIAM C. CROSBY

Your letter to the Editor of AMERICAN FORESTRY has been referred by him to the Forest Service for reply. For your information on eucalyptus, I take pleasure in requesting the Division of Publications to send you the following Forest Service publications: Circular 59, a planting leaflet on eucalyptus; Circular 179, "The Utilization of California Eucalyptus," and Bulletin 87, Eucalypts in Florida."

Detailed information on the more important species which have been introduced into this country can also be found in Forest Service Bulletin 35, "Eucalypts Cultivated in the United States," a copy of which may be obtained from the Superintendent of Documents, Washington, D. C., for \$1 (stamps not accepted). There has also been prepared by the Forest Service in co-operation with the California State Board of Forestry a bulletin entitled "Yield from Eucalyptus Plantations in California," which can be obtained through Mr. G. M. Homans, State Forester, Sacramento, Cal. I believe these various publications will give you the information you desire.

I would call your particular attention to the discussion on pages 31 to 33 of Bulletin 87, concerning the eucalyptus in Florida. Whether the eucalyptus is planted in Florida, California, or elsewhere in the United States, our present knowledge of the timber produced by plantations in this country does not justify a too sanguine estimate of returns where it is proposed to produce material other than fuel woods, which requires a much longer period to reach marketable size. While it is believed that a eucalyptus plantation will yield under favorable conditions a revenue equal to any forest plantation, it remains to be proven whether in the produc-

tion of large material it will yield the phenomenal returns generally claimed for it.

I regret to inform you that no provision is made for the free distribution by the Forest Service of forest tree seeds or seedlings. I take pleasure, however, in inclosing a list of dealers from whom the stock which you desire can be obtained.

LOUIS S. MURPHY,

Acting in Charge of Forest Management in the East.

Charleston, West Va.

EDITOR AMERICAN FORESTRY.—Can you give me the following information, viz.: Have you any record which shows how many million feet of standing timber (board or cubic measure) is computed to now be contained within the limits of West Virginia? Also what cut of timber ought to be annually made in order to preserve these forests from year to year, taking into consideration the felling of timber and new growth?

WM. SEYMOUR EDWARDS.

DEAR SIR: Your letter of October 5 to the American Forestry Association has been referred to the Forest Service for reply. I take pleasure in informing you that the only available records, as far as I know, of the standing timber in West Virginia are to be found in the report of the West Virginia Geological Survey, Volume 5, 1911. According to this report, the total area of virgin forest in West Virginia is 1,574,295 acres. Of this area, 190,000 acres contain from 20 to 90 per cent of spruce in Randolph, Pocahontas, Webster, Pendleton, Greenbrier, and Tucker Counties, with a few outlying patches in Grant and Preston Counties. The quantity of standing timber in these 190,000 acres is estimated at 1,500,000,000 feet of spruce, 1,000,000,000 feet of hemlock and 1,500,000,000 feet of beech, birch and maple. The forests of virgin hardwood contain about 12,000,000,000 feet of timber, something as follows: White oak, 30 per cent; other oaks, 15 per cent; yellow poplar, 18 per cent; chestnut, 12 per cent; maple, 5 per cent; beech, 5 per cent; basswood, 5 per cent; other hardwoods, 10 per cent.

In addition to the 1,574,295 acres of virgin forest, there are 2,882,030 acres of cut-over forest and 5,087,013 acres of farmers' woodlots. On these areas the stand of timber is not definitely known. In some cases, many woodlots have from 1,000 to 5,000 feet of merchantable timber per acre.

As the area occupied by growing timber is not definitely known, the growth that takes place over this area can not be ascertained. From the report of the West Vir-

ginia Conservation Commission it appears that on the basis of 8,000,000 acres of land permanently devoted to productive forest, allowing an annual growth of only 25 cubic feet for each acre, the possible yearly harvest from the whole state would be 1,600,000 feet, board measure. Twenty-five cubic feet of annual growth per acre is a very conservative estimate, and if an area of 8,000,000 acres in the state can be protected from fire and be kept in a productive state, the estimated yearly increment for the whole state is none too great.

You can undoubtedly secure a copy of the report of the Geological Survey from I. C. White, State Geologist, Morgantown, W. Va., and will be able to find more detailed information concerning the timber resources of West Virginia as each county is taken up separately in that report.

RAPHAEL ZON,
Chief of Silvics.

Boston, Mass.

EDITOR AMERICAN FORESTRY.—Please describe to me a method for determining the height of trees and estimating the amount of standing timber?

ABNER H. BARKER.

MR. ABNER H. BARKER,

146 Summer St., Boston, Mass.:

Dear Sir.—Your letter of September 18, addressed to the American Forestry Association, was forwarded to the Forest Service for reply. I take pleasure in sending you, under separate cover, Bulletin 36, "The Woodsman's Handbook," which describes the methods of determining the height of trees

and estimating the amount of standing timber. I am also sending you Bulletin 76, "How to Grow and Plant Conifers in the Northeastern States," which will give you information in regard to raising and planting forest trees. I am sorry to say that the Forest Service has no publications dealing with the grafting and spraying of trees. This information can undoubtedly be obtained by writing directly to the Bureau of Plant Industry, Washington, D. C.

RAPHAEL ZON,
Chief of Silvics.

EDITOR AMERICAN FORESTRY.—Being in a charcoal business, I would like to know if you could secure me bulletins or books on the subject. I am just starting a company in Quebec, and I would be obliged to you if I could get good hints and information on the subject.

H. KIEFER, C. E.

Dear Sir.—Your letter of October 9 to the American Forestry Association has been forwarded to this laboratory for reply. The Office of Publication has been requested to send you Forest Service Circular 114, which is the only Forest Service publication dealing with the production of charcoal. The literature on this subject is very meager, and there is practically nothing dealing with charcoal production without the recovery of by-products. It would be a pleasure to give you any further information possible on specific points not mentioned in the above publication.

MCGARVEY CLINE,
Director.

TO STUDY FLOODS

SECRETARY WILSON of the United States Department of Agriculture has decided to establish an experiment station on the Manti National Forest near Ephraim, Utah, for the study of grazing and water protection problems. Bids for the construction of the necessary buildings have been received and it is expected to have the station in working order before winter. Already the gathering of observations on the relations of erosion and run-off to the forest cover have begun.

The Manti National forest was chosen as the site for this experiment station because it offers exceptionally good opportunities for investigating problems

of practical value in connection with regulated grazing. Ephraim and other towns in its neighborhood have suffered severely from floods following violent rainstorms in the mountains, and it has already been proved conclusively that the over-grazed condition of areas on which the natural vegetative cover has been seriously altered is responsible for the formation of torrents and the rapid discharge of debris-laden flood waters. In a recent destructive storm the water ran clear from a part of the watershed which was within the National Forest, and in good condition as a result of well regulated grazing, while from other areas it swept down sand and boulders.

STATE NEWS

North Carolina

Another important step in the campaign for better forest laws for North Carolina was taken at North Wilkesboro on Tuesday evening, October 8. At the call of Mr. C. C. Smoot III, Vice-President of the North Carolina Forestry Association for that district, a meeting was held for the purpose of organizing the forces in Wilkes County which are favorable to forest protection, so that something definite might be accomplished in this direction at the coming session of the Legislature next January. Mr. J. S. Holmes, Secretary-Treasurer of the North Carolina Forestry Association, was present and explained the objects for which the State Association had been organized and what could be accomplished by a local club. A permanent organization was unanimously agreed upon, and the Wilkes County Forest Protective Association was formed, the twenty men present all agreeing to become members. Mr. A. A. Finley was elected President and Mr. W. E. Pharr, Editor of the North Wilkesboro Hustler, Secretary. Mr. C. C. Smoot, of the C. C. Smoot & Sons Tannery, was elected Vice-President for North Wilkesboro Township. These three officers were appointed as a temporary executive committee, to draw up by-laws and put the Association in thorough working order. One vice-president for every township in the county was appointed.

A strong resolution was passed calling on the Wilkes representatives in the next Legislature to do all in their power to secure adequate laws for the protection of the forests of the state from fire.

This is the third County Association organized since the forming of the North Carolina Forestry Association some two years ago. It is composed of the most live and progressive men of the county, and they mean business. They are determined that men favoring state forest protection shall be elected this fall to represent Wilkes County in the next General Assembly.

Vermont

State Forester A. F. Hawes of Vermont has recently returned from Brandon, where with an assistant he has been marking trees for this winter's cutting on the land of Newton-Thompson Manufacturing Company. This concern is taking a very progressive stand in the management of its extensive forest areas, having become interested in better management through some work done

under the state forester two years ago in Brandon on land belonging to Miss Julia A. C. Jackson. Mr. Bump, the president of the company, told the state forester that when the forestry work was started in Vermont he thought that the doom of the lumber business was at hand. He has now become satisfied that the lumber industry can only be perpetuated through forestry.

The Newton & Thompson Manufacturing Company is one of the most interesting wood-working establishments in the state, making all kinds of novelties, pill boxes, toys, etc., that are made from wood. Their machinery, which is nearly all automatic, turns out an immense amount of work a day, and about eighty men are constantly employed in the sawmill, machine shop, and turning mill. Practically every kind of native lumber is used, from white pine down to soft maple. It is this opportunity to use inferior woods, and even small pieces, which gives this company such a splendid chance to practice forestry.

The company owns about 6,000 acres in the region, and has now begun a systematic thinning of its more accessible areas so as to insure more rapid growth and a permanent supply of lumber. The areas marked by the state forester this year are mostly of pine growth in the vicinity of Forestdale. The smaller and poorer pines were marked to be cut as well as the inferior hardwoods, such as soft maple and beech. In no case were there any large openings made since an undesirable growth of underbrush is almost sure to follow such a course, especially in that region. In some of the lots the ground was covered with little pine seedlings which have started within a year or so. Wherever these occurred light was admitted by a heavier cutting so as to allow the young seedlings an opportunity to grow. This is a good illustration that pine may easily succeed itself if properly treated, despite the common belief to the contrary. The state forester estimates that much of this land after thinning will grow from 500 to 800 board feet per acre per annum.

Not only is the Newton & Thompson Manufacturing Company practicing forestry on its own lands, but it is persuading some of the other woodland owners in the neighborhood to do likewise. Since their supply comes partially from these neighbors, their interest in the welfare of these wood lots is not altogether unselfish, but it furnishes an excellent illustration of a most advanced forest policy.

In the industrial future of Vermont there will probably be fewer and fewer companies

engaged simply in lumbering. The tendency is toward a closer utilization near the forests. It is such concerns as Newton & Thompson and the International Paper Company, that are dependent upon a permanent wood supply, that will save the forests of Vermont. The state forester is constantly having more demands for advice and for marking. This marking is done for any land owner in the state on areas up to 50 acres a year simply for the traveling expenses and board of the men while doing the marking. In most classes of timber two men can blaze the trees to be cut on 50 acres in two or three days.

Pennsylvania.

The Pennsylvania Department of Forestry has had four of its foresters assisting the Federal Forest Service in the collection of data concerning the wood-utilizing industries within the state. The field work has been completed.

During the spring planting season there were set out on the state reserves two and a quarter million seedlings. Since the planting operations the foresters have been busy opening, cleaning, and improving roads, building fire towers and telephone lines. During the last two months fourteen new telephones were installed and about fifty miles of new telephone line built, or newly acquired lines repaired.

The state has recently acquired a tract of land at \$4 per acre which has a grove of tulip poplar covering about fifty acres. Eighty-five per cent of the trees on the area are tulip trees ranging from 4 to 8 inches in diameter and average 80 feet in height. There is also a grove of almost pure black walnut covering twenty acres. The walnuts are straight, tall, and thrifty. The soil is moist and sandy.

The recent Legislature yielded to a large number of petitioners in northeastern Pennsylvania and appropriated \$1,000 for the rebuilding of a dam on the state reserve in Pike County. The appropriation was given to the Department of Forestry to carry out the provisions of the act. The department built the dam on the site of an old sawmill dam, and built it considerably higher. The new dam is bedded on solid slate rock, with a concrete toe and proper iron dowels. It is six feet higher than the spillway of the old dam and forms a pond covering about 800 acres.

The forest reserves are to be made recreation grounds for the people as well as to be used for growing timber. This artificial lake makes one of the largest in the state and will afford a splendid opportunity to many to hunt and fish. At the same time, under the protection of the forestry officials, game birds and fish will no doubt multiply in the locality.

Connecticut

Former State Forester Samuel N. Spring of Connecticut has taken up his duties at Ithaca, as professor of forestry in the New York State College of Agriculture. W. O. Filley, who was Mr. Spring's assistant for the past three years, and who since October 1, 1911, has held the appointment as assistant state forester, has succeeded him. A. E. Moss, recently of the Forest Service, is to be Forester Filley's assistant, although no assistant state forester will be appointed at present.

Alabama

John Wallace, Jr., game and fish commissioner of Alabama, is advocating a movement looking to converting all state lands, whether held in fee or in trust, into state game refuges and forest preserves.

Alabama owns hundreds of thousands of acres of swamp and overflowed lands, Sixteenth Section school lands and tax redemption lands. It is Commissioner Wallace's purpose, by an Act of the Legislature, to set aside these lands as nesting, resting and breeding places for birds and game, to be held forever sacred for that purpose, also for forest preserves. The Department of Game and Fish would employ wardens to patrol the lands and see to it that the birds and game are not disturbed, that the growing timber is not cut down and destroyed and that no fire is set to the forests.

This movement has gained great impetus in Alabama, and the people seem to be a unit in demanding that the scheme be enacted into a law. In addition to this specific plan, Wallace is endeavoring to work out a general conservation movement which contemplates the creation of a state conservation commission to have charge of the management, control and development of all of the state's natural resources.

Maryland

The Maryland State Board of Forestry is making extensive preparations for the fire season this autumn. Additional patrolmen have been engaged and several lookout stations are being provided for in the mountain section.

Mr. Chapin Jones, who came to Maryland as assistant state forester on August 1, will have charge of the fire protection work. Mr. Jones graduated from the Yale Forest School in 1909 and has since been in the employ of the United States Forest Service, forestry department of the Pennsylvania Railroad and in State work in New Hampshire.

Maryland is co-operating with the Forest Service under the Weeks Law and, with the increased appropriations for fire protection

secured last winter, the state is in good shape to handle the forest fire situation.

New York

The New York Conservation Commission has adopted the policy of fall shipments of trees, and a large number of orders have been filled and many plantations made during this present fall season.

Three hearings have been held, and a field investigation will be commenced within the next week in order to determine the efficiency of the top-logging law.

Bulletin No. 8 on the three new forest taxation laws has been issued, and various matters in connection with the enforcement of these laws are now under consideration by C. R. Pettis.

The Commission has also issued Bulletin No. 1 on general forestry and Bulletin No. 7 on shade trees, by Forester Gaylord.

A new nursery of five acres has been established at Lake Clear, and about three-quarter million trees have been transplanted, and an equal number of trees have been set out on state land near Paul Smith's.

Forester Rosenbluth is engaged in preparing a working plan for the state prison lands at Dannemora, in the Adirondacks.

An exhibit of the forestry work of the Commission was made, not only at the State Fair, but at about fifteen county fairs.

The reports of forest fires will approximate about 5,000 acres for the entire season up to the present time. Last year nearly 40,000 acres were burned. The decreased loss is due largely to the increase in the number of mountain stations and greater efficiency in the fire protective work as indicated by the fact that the number of fires this year were as great as last year, and the drought during June and July was as severe as in former years.

Massachusetts

No state in the union has made more rapid progress in building up a constructive forest policy than has Massachusetts during the past five years. The recommendations of State Forester Rane made to the Legislature from year to year have been received with favor, and all of the important ones have been enacted into legislation. Perhaps the most gratifying accomplishment of the department has been the development of the forest fire service, which has now been brought up to the highest point of efficiency. Eighteen lookout stations have been in operation throughout the season, from which over 2,000 fires have been reported. The promptness with which these fires have been discovered and reported by the observers has made possible in most cases their extinguishment before serious damage had resulted. In addition to the above system of reporting fires, arrangements have been made with the

United States Post Office Department to have all rural and star route mail carriers report to the forest wardens or deputies any fires which may occur on lands bordering their routes. Early last April the Massachusetts Division of the Boy Scouts of America generously volunteered to co-operate with the state in its efforts to reduce the forest fire evil, and by reporting fires and aiding in their extinguishment have been a valuable factor in making the work a success. Each scout master has been furnished a copy of the fire laws and book of instructions published by the forestry department, containing the names of all forest wardens and deputy wardens in the state.

Recognizing the importance of a change in the present methods of taxing forest lands if the encouragement is to be given forest land owners, which is necessary to constructive forestry, the Legislatures of 1911 and 1912 passed a resolve providing for an amendment to the Constitution, empowering the General Court to prescribe the method of taxing such lands. This proposed amendment will be submitted to the voters of the state at the coming election for their acceptance or rejection.

If it is accepted, and it is the general belief it will be, a committee appointed by the Massachusetts Forestry Association and the Boston Chamber of Commerce, working jointly, will begin immediately the preparation of a bill to be introduced into the incoming Legislatures, designed to eliminate some of the objectionable features of the present method of taxing wild or forest lands.

Michigan

Professor Tyler, of the Michigan Agricultural College, announces the formation of local organizations in several counties to prevent the useless waste of trees. Besides preventing the waste, the organizations will also attempt to teach the farmers and others interested how to utilize their waste ground in the interest of reforestation. Mr. Tyler says: "Unless we do something for the trees there will soon be no forests in the northern part of Michigan on account of the great forest fires, and in the southern part we are tree destroyers instead of tree planters. Only 1 or 2 per cent of the number of trees cut down are replanted in southern Michigan."

Under the plan which Mr. Tyler has worked out an experimental woodlot of five acres will be provided in the community where each organization is affected. The farmer who gives up five acres of his land to this work will have to contract with the college not to cut a tree during the first twelve years nor make any radical move without first obtaining the permission of the extension service of the college. Seedlings will be furnished by the college and set out

under the direction of Mr. Tyler. If he says plow the land and sow oats in August, the farmer will have to do so, but all the profits of the experimental work will be his and the trees will be his at the end of the twelve years. If any question arises which he can not answer, he has back of him the forestry department. Should the forestry department be unable to answer it, then it can go to the National Government.

Indiana

An experiment with the culture of Jersey pine trees in Indiana will be made by the State Board of Forestry as a part of its work for the coming year. The trees will be planted on the forest reservation in southern Indiana.

Charles C. Deam, secretary of the board, asserts that the Jersey pines are not grown extensively in Indiana at this time, and that the board is desirous of introducing them, particularly to test their productiveness in this state. Mr. Deam says pine trees are peculiar in that they thrive in poor soil. There are some on the reservation now measuring two feet in diameter.

At a meeting of the board recently the year's work at the reservation was mapped out. Fifty acres of various sorts of trees will be planted during the year. The list includes hickory, sycamore, arlanthus and locusts. In addition to these there will be three kinds of oak planted, the red, white and burr oaks.

Tennessee

The Nashville Board of Trade has appointed a committee of prominent members to consider measures for the preservation of the forests of Tennessee. Charles M. Morford, a lumber manufacturer and shipper, is chairman of the committee, and most of the members are lumbermen who belong to the board of trade. The object of the board of trade is to co-operate with the Nashville Lumbermen's Club in taking such steps as can be taken to conserve the forestry resources of the state. It is probable that the next Legislature will be asked for an appropriation to aid in the enforcement of the forestry laws of the state.

Kentucky

The new forest policy of Kentucky was outlined recently by J. E. Barton, state forester, who was the guest of the Louisville Hardwood Club. Mr. Barton took the first opportunity to convince the lumbermen that the work of the forester and the practical timberman are mutually beneficial, and made so favorable an impression that he was elected an honorary member.

The plans of the new state forestry board, of which he is the active representative, include the following:

The establishment of nurseries, both for demonstration purposes and as a business proposition, including the sale of seedlings to private concerns which are engaging in forestry work.

The purchase of lands and the acquirement of others by gift where forest reserves may be established and timber raised in commercial quantities.

The study of the possibilities of preventing waste in timber logging and manufacturing, and the utilization of by-products, involving the establishment of a laboratory for the use of lumbermen and wood users.

The protection of the forests by the enactment of adequate laws looking to proper fire protection and the prevention of grazing on forest lands, which would result in young trees being killed or seeds destroyed.

The study of streams and stream flow, and regulating them by the planting of forest at their headwaters, thus preventing floods. Study of water power possibilities is also to be included in this provision.

Co-operation with individuals in examining timber tracts, laying out a plan of scientific management and aiding in the operation of the property. This work will be begun early in 1913, when the forestry work will have been fully organized.

Montana

President Taft has issued proclamations changing the boundaries of the Missoula and Madison National Forests, Montana. From the former 4,960 acres are eliminated and from the latter 68,140 acres. These eliminations are the result of field examinations which the Department of Agriculture has been making in pursuance of a general plan to correct the National Forest boundary lines.

The areas eliminated from the Missoula National Forest are along the borders of the Flint Creek and Rock Creek exclusion of the Southern Division. They consist of small areas along the foothills, chiefly valuable for grazing purposes.

The greater part of the Madison elimination embraces what is locally known as the Lower Madison Basin and lies in two main bodies, one in Tps. 9 and 10 S., R. 1 W., and the other in Tps. 11, 12 and 13 S., Rgs. 1 and 2 E. Another rather large exclusion occurs in Tps. 9 and 10 S., R. 4 W. The remaining areas are small tracts at various points along the borders of the forest. Most of the lands excluded are grazing lands, although some areas in the Lower Madison Valley are susceptible of cultivation.

The public lands within the areas were by the same proclamation withdrawn for classification under the Act of June 25, 1910, to be restored to settlement and entry at the discretion of the Secretary of the Interior.

New Jersey

The New Jersey Forest Commission announces that the Forest Fire Patrol maintained in North Jersey in co-operation with the United States Forest Service is being reorganized for the fall work. Instead of emphasizing particularly the railroad exposure, as has been done during the spring and summer, attention will be centered more on the danger in the woods.

During the summer there have been 93 fires reported by patrolmen, none of which were allowed to assume any size, and most of which were put out by the patrolmen themselves, thereby preventing possible forest fires, with their consequent damage and costs. Whether it be primarily due to the patrol, to increased activity and efficiency of the local wardens, or to a growing public interest in forest protection, there is no doubt that fires are markedly fewer and less serious in this section than heretofore.

The fall work is planned with especial reference to automobile and nutting parties and the sportsmen. A small number of men went on duty on October 1 at places particularly exposed, and the full force will be available from October 15 to the end of the season. The patrol this year will differ from that of last season in that the patrolmen will be less restricted to the roads and are expected to pick up those responsible for fires in the woods. Though their first duty is to watch for and notify the fire wardens of fires, they are particularly instructed and are empowered to arrest all violators of the law, in the woods or along the roads, whether building fires without permits or dropping lighted matches, tobacco, etc. In this way the Forest Commission expects to put a stop to the carelessness with fire so prevalent among those in the woods for an outing or hunting trip.

These officers, with the rural mailmen, who also are serving as patrol under an order of the Postmaster General issued last spring, are expected to minimize the fire danger this season.

STATE FIRE WARDEN.

Prof. Ferguson Returns to Penn State

After an absence of one year, during which time he has been head of the Department of Forestry at the University of Missouri, Prof. John A. Ferguson returns to the Department of Forestry at the Pennsylvania State College as its head. Before going to Missouri Professor Ferguson was connected with this school for three years and was in charge for nearly two years in the absence of the head of the department.

California.

A great deal of interest has been displayed of late by the various women's clubs throughout the State concerning forestry, especially that phase of it dealing with forest fire protection. At a recent meeting of the Northern District of the Federation of Women's Clubs, Forestry in California was the main issue of discussion. During this meeting, many resolutions concerning forestry were adopted, chief of these being to assist in a real publicity campaign against forest fires.

Forestry in California is still in its infancy and such cooperation as exists, at present, between the various Women's Clubs and this department, concerning the educational feature of the work, is very encouraging indeed.

So far, the work of the department has necessarily been of an educational nature, due to a lack of funds to carry on any other work. However, with the small amount that was available—an investigation of cut-over and timbered land, with special attention paid to slash conditions and waste in logging, was made during the summer months. The results of these investigations will be fully discussed in the biennial report of the State Forester which will be available about January 1, 1913.

California is badly in need of a forest fire system and legislation looking toward that end is being drawn up with a view of presenting it at the next legislature.

Much valuable information concerning the kinds and amounts of wood produced in the State and demanded by the industries manufacturing finished products, as well as a directory of such manufacturers, is contained in a volume recently issued by the State Board of Forestry, in cooperation with the U. S. Forest Service, and entitled "Wood Using Industries of California."

The volume is for general distribution among people who are interested and a copy may be obtained by addressing the State Forester, Sacramento, California.

Mr. R. H. Boynton has resigned his position as Assistant State Forester to go into private business. Mr. Ralph W. Sloss, who has been a field assistant in the department for the past year, has been appointed to fill the position vacated by Mr. Boynton.

Early Conservation Ideas

In the provincial charter of 1691, under which the Plymouth colony and the province of Maine were united with Massachusetts, it was provided that all trees of the diameter of twenty-four inches and upward, twelve inches from the ground, growing upon land not heretofore granted to any private person, should be reserved to the crown for the furnishing of masts for the royal navy.

A surveyor-general of woods was appointed to see that this provision of the charter was carried into effect. Near the coast all white pines of suitable dimensions were marked with the "broad arrow"—three cuts across the bark with an ax, like the track of a crow. This was the King's mark.

Long after the Revolution had obliterated the royal authority men who had been taught in boyhood to respect the King's mark hesitated to cut such trees.

In felling a tree it was necessary to "bed

it" to prevent its breaking. This was done by cutting the small growth and placing the small trees across the hollow, so that there should be no strain upon one section more than upon another when the monster pine struck the ground.

The mast was hauled out of the woods on one strong sled, whether in winter or summer, and so many oxen were required that the hind pair were often choked in crossing a hollow, being hung up in their yoke by the pulling of those ahead of them.

FIRE NOTICES TO TEACHERS

The State Forestry Department of Minnesota has mailed 15,000 circulars to superintendents of high schools and public school teachers of the State, calling attention to Fire Prevention Day. Approximately seven circulars will be given each teacher, and observation of the day is asked in the public schools of the State.

The circulars sent out by the State Forester call attention to the danger of fires, and ask an observance of rules for the prevention of serious conflagrations.

"Minnesota has suffered more than any other State through forest fires," the circular reads. "Hundreds of our people have been burned to death. Untold millions of dollars worth of property has been consumed."

CURRENT LITERATURE

MONTHLY LIST FOR OCTOBER, 1912.

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Gaylord, F. A. Forestry and forest resources in New York. 58 p. pl. Albany, N. Y., 1912. (New York—Conservation commission—Division of lands and forests. Bulletin 1.)

Hay, R. D. General principles of forestry. 2 p. Sydney, 1912. (New South Wales—Department of forestry. Bulletin 1.)

Proceedings and reports of associations, forest departments, etc.

India—Bengal—Forest dept. Annual progress report on forest administration in the lower provinces of Bengal for the year 1910-1911. 51 p. Calcutta, 1911.

India—Eastern Bengal and Assam—Forest dept. Progress report of forest administration for the year 1910-1911. 91 p. Shillong, 1912.

Russia—Lyesnoi department (Forest dept.) Ezhegodnik (Yearbook), 1910, v. 1-2. St. Petersburg, 1912.

Forest Aesthetics

Hurst, Charles. The book of the English oak. 196 p. pl. London, Lynwood & Co., 1911.

Street and park trees

St. Louis—City forester. Annual report for the fiscal year ending April 11, 1912. 8 p. St. Louis, Mo., 1910.

Forest Education

Graves, Henry Solon. The profession of forestry. 17 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 207.)

Forest Legislation

British Columbia—Legislative assembly. An act respecting forests and crown timber lands, and the conservation and preservation of standing timber, and the regulation of commerce in timber and products of the forest. 52 p. Victoria, B. C., 1912.

Forest Description

Maryland — Geological survey. Prince George's county. 251 p. pl. and atlas. Baltimore, 1911.

Forest Botany*Trees; classification and description*

Perez, Georges V. *Le Juniperus cedrus*. 3 p. il. Paris, Société nationale d'horticulture de France, 1912.

Silvics*Studies of species*

Harper, Roland M. The diverse habitats of the eastern red cedar and their interpretation. 10 p. N. Y., Torrey botanical club, 1912.

United States—Dept. of agriculture—Forest service. Broadleaf maple; *Acer macrophyllum*. 4 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Silvical leaflet 51.)

United States—Dept. of agriculture—Forest service. Oregon oak; *Quercus garryana*. 4 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Silvical leaflet 52.)

United States—Dept. of agriculture—Forest service. Red alder; *Alnus oregona*. 4 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Silvical leaflet 53.)

United States—Dept. of agriculture—Forest service. Western hemlock; *Tsuga heterophylla*. 6 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Silvical leaflet 45.)

Zederbauer, Emil. Versuche über individuelle auslese bei waldbäumen; 1. *Pinus silvestris*. 12 p. il., pl. Wien, W. Frick, 1912.

Silviculture*Planting*

Gollan, A. A. Afforestation. 5 p. Sydney, 1912. (New South Wales—Dept. of forestry. Bulletin 2.)

Hay, R. D. Re-afforestation. 4p. Sydney, 1912. (New South Wales—Dept. of forestry. Bulletin 4.)

Forest Protection*Insects*

Forbes, Stephen A. Some important insects of Illinois shade trees and shrubs. 67 p. il. Urbana, Ill., 1911. (Illinois—Agricultural experiment station. Bulletin 151.)

Diseases

Forbes, Stephen A. What is the matter with the elms in Illinois? 22 p. il. Urbana, Ill., 1912. (Illinois—Agricultural experiment station. Bulletin 154.)

Fire

Plummer, Fred G. Lightning in relation to forest fires. 39 p. il., p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 111.)

Forest Management*Forest mensuration*

Maw, P. Trentham. Complete yield tables for British woodlands and the finance of British forestry. 108 p. London, C. Lockwood & Son, 1912.

Tkachenko, M. Das gesetz des inhalts der baumstämme und seine bedeutung für die massen—und sortimentstafeln. 23 p. Berlin, P. Parey, 1912.

Range management

United States — House — Congress — Committee on public lands. Improvement and regulation of grazing on the public lands of the United States; hearings on H. R. 19857, May 3, 4, 7, 10 and 29, and July 29, 1912. 127 p. Wash., D. C., 1912.

Forest Economics*Statistics*

Lewis, R. G., comp. Forest products of Canada, 1911; tight and slack cooerage. 13 p. Ottawa, 1912. (Canada—Dept. of the interior—Forestry branch. Bulletin 31.)

Switzerland—L'inspection fédérale des forêts. Produktion und verbrauch von nutzholz. —A. Einleitung: Einige statische angaben über die forstlichen verhältnisse der Schweiz. 77 p. maps. Zürich, 1912. (Schweizerische forstatistik, 3. lfg.)

Forest Administration*National and state forests*

Gibson, Henry H. Appalachian national forest. 12 p. Chicago, Ill. Hardwood record, 1912.

United States—Dept. of agriculture—Forest service. The national forest manual; general administration and protection. 87 p. Wash., D. C., 1912.

United States—Congress—House—Committee on public lands. Consolidation of certain forest lands; hearings on senate bill 4745, Feb. 28 and 29, 1912. 30 p. Wash., D. C., 1912.

Forest Engineering

United States—Dept. of agriculture—Forest service. Instructions for the building and maintenance of telephone lines on the national forests. 54 p. il. Wash., D. C., 1912.

Forest Utilization*Wood technology*

Cline, McGarvey, and Heim, A. L. Tests of structural timbers. 123 p. il., pl., map. Wash., D. C., 1912. (U. S. Dept. of agriculture—Forest service. Bulletin 108.)

Dunlap, Frederick. The specific heat of wood. 28 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 110.)

Knapp, Joseph Burke. Fire-killed Douglas fir; a study of its rate of deterioration, usability and strength. 18 p. il., diagrs. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 112.)

Wood preservation

Powell wood-process syndicate. The Powell wood-process, for rapidly seasoning, preserving and improving wood, security against dry rot, protection against white ants and wood-destroying insects. 79 p. il. London, 1912.

Teesdale, Clyde H. The absorption of creosote by the cell walls of wood. 7 p. il. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 200.)

Winslow, Carlile P. Condition of experimental chestnut poles in the Warren-Buffalo and Poughkeepsie-Newton Square lines after five and eight years' service. 13 p. il. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 198.)

Auxiliary Subjects

Conservation and natural resources

Canada—Commission of conservation. Report of the third annual meeting held at Ottawa, Jan. 16, 1912. 154 p. pl., map. Ottawa, 1912.

Michigan—Public domain commission. Joint conference of those interested in the conservation and development of the natural resources of Michigan, held June 12, 1912. 121 p. maps. Lansing, Mich., 1912.

National parks

United States—Congress—House—Committee on public lands. Western boundary of Yosemite national park; hearings, March 20, 1912, on H. R. 21954. 13 p. Wash., D. C., 1912.

United States—Department of the interior—Office of the secretary. Sketch of Yosemite national park and an account of the origin of the Yosemite and Hetch Hetchy valleys. 47 p. il. Wash., D. C., 1912.

United States—National park conference. Proceedings held at the Yellowstone national park. Sept. 11 and 12, 1911. 209 p. Wash., D. C., Gov't printing office, 1912.

Game protection

Palmer, T. S. National reservations for the protection of wild life. 32 p. il. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Biological survey. Circular 87.)

Periodical Articles

Miscellaneous periodicals

Continental magazine, April, 1912.—The conservation idea, by G. Grosvenor Dawe, p. 8-10; The forests of Minnesota, by Wm. T. Cox, p. 44-6.

Country life in America, Sept. 1, 1912.—White pine conservation on the farm, by Phil M. Riley, p. 33-5.

Country life in America, Oct. 1, 1912.—Caring for a farm woodlot, by Phil M. Riley, p. 35-6.

Gardener's chronicle, Aug. 24, 1912.—Mistletoe in Shensi, by F. Kingdon Ward, p. 147-8.

Hearst's magazine, Aug. 1912.—Our doomed chestnut trees, by H. S. Williams, p. 102-3.

Journal of the Association of engineering societies, Aug., 1912.—The value of saw-mill refuse as fuel in gas producers, by Chas. E. Snypp, p. 35-41.

Philippine agricultural review, Sept., 1912.—Shade trees for the Philippines, by P. J. Wester, p. 480-7; Trees for street planting, by Wm. S. Lyon, p. 496-501.

Review of reviews, Oct., 1912.—The Everglades of Florida, by Thomas E. Will, p. 451-6.

Science, Aug. 30, 1912.—Resins and their chemical relations to the terpenes, by G. B. Frankforter, p. 257-63.

Scientific American, Sept. 21, 1912.—The mahagua tree as a source of fiber, p. 240; Cultivation of the true cinnamon, p. 242.

Scientific American supplement, Sept. 7, 1912.—The conservation of snow; its dependence on forests and mountains, by J. E. Church, p. 152-5.

Technical world magazine, Sept., 1912.—To stop the waste of forest products, by Robert H. Moulton, p. 49-52.

Trade journals and consular reports

American lumberman, Sept. 14, 1912.—Guardianship of the public forests of British Columbia, by W. R. Ross, p. 41-2; Closer utilization of Pacific coast timber, by J. B. Knapp, p. 43-4; Methods of forestry campaigning, by E. T. Allen, p. 44-5.

American lumberman, Sept. 28, 1912.—An analysis of observations at an Arkansas logging operation, by R. C. Bryant, p. 38-9; Relation of wire rope to the lumber business, p. 48; Doweled doors; an English aspect, by W. J. Blackmur, p. 71.

American lumberman, Oct. 5, 1912.—Forestry conditions in China, p. 30-1.

American lumberman, Oct. 12, 1912.—Taxation of timberland holdings, by W. H. Shippen, p. 39; The present situation of forestry, by Henry Solon Graves, p. 45-6;

- Development and status of wood preservation, by E. A. Sterling, p. 47-8.
- Barrel and box, Sept., 1912.—Various types of bread boxes, p. 51-2.
- Canada lumberman, Sept. 1, 1912.—Sorting and rafting on the Restigouche, p. 60-1; Nova Scotia's domestic use of wood, by J. B. Whitman, p. 62; Forestry methods in province of Quebec, p. 67-8; The pulp and pulp-wood trade of Quebec, p. 69-70; Newfoundland's timber and pulp trade, by M. S. Sullivan, p. 78-9; Typical small B. C. logging operation, by G. H. Prince, p. 90-2.
- Canada lumberman, Sept. 15, 1912.—Sacrificing pulpwood for Christmas trees, p. 28; Quebec's timber and pulp resources, by Gebhard Willrich, p. 32; How to make hardwood business pay, by H. E. Miles, p. 36-8; Piano case wood, p. 53.
- Canada lumberman, Oct. 1, 1912.—New Brunswick logging conditions, p. 32-5.
- Engineering news, Aug. 1, 1912.—Wood in compression; bearing values for inclined cuts, by Malverd A. Howe, p. 90-1.
- Engineering record, Aug. 10, 1912.—The new Port Reading creosoting plant, n. 148-50.
- Furniture journal, Sept. 10, 1912.—Best methods of laying floors, by Arthur Clausen, p. 51; Cork making an interesting process, p. 51.
- Furniture journal, Sept. 25, 1912.—Fashion's favor in furniture; how fine cabinet woods are chosen, p. 62-3.
- Hardwood record, Sept. 10, 1912.—Red haw, p. 25-6; Natural durability of wood, by S. J. Record, p. 28-9; Crabwood and its uses, by C. D. Mell, p. 29; Use of blight-killed chestnut, by S. J. Record, p. 30-2; American white oak of quality, p. 35-47; Evolution in lumber seasoning, n. 49-50; Forest school, Michigan college, p. 51-2.
- Hardwood record, Sept. 25, 1912.—The principal shuttlewoods, p. 24-5; Manufacture of meat blocks, p. 26; Prima vera and its uses, by C. D. Mell, p. 27; Save your sawdust, p. 27-8; Woods used in saw handles, by S. J. Record, p. 28; Dagame of commerce, by C. D. Mell, p. 29; In far-off Alaska, by Felix J. Koch, p. 29; Important Brazilian woods, by C. D. Mell, p. 31.
- Hardwood record, Oct. 10, 1912.—The manufacture of wooden pipe, p. 23-4; Spring and summer wood, p. 25-6; What is padouk? by L. L. D., p. 27; The commercial spruces, p. 28-31; Japanese oak abroad, p. 31; The fuel value of wood, by S. J. Record, p. 32-3.
- Lumber trade journal, Sept. 15, 1912.—Methods of preparing wood block paving in France, by P. Labordere, p. 19.
- Lumber trade journal, Oct. 1, 1912.—The southern logger and forest fire protection, by Henry Solon Graves, p. 20; Logging as an engineering science, by George M. Cornwall, p. 24-5; Recent development of the electric logging engine, by J. M. Matthews, p. 25; Comparative comparative qualities of various preserving oils, by H. Lynn Beach, p. 26-7.
- Lumber world review, Sept. 25, 1912.—Forest surveys in timber land operations, by E. A. Sterling, p. 24-5.
- Pacific lumber trade journal, Sept. 1912.—How Philippine forests are being developed and what they offer, by Charles Kirkwood, p. 41-2.
- Paper, Sept. 11, 1912.—The scientific manufacture of sulphite pulp, by Chas. M. Bullard, p. 15-16.
- Paper, Sept. 18, 1912.—Bamboo cellulose, by William Raitt, p. 22-5.
- Paper, Sept. 25, 1912.—The soda process for cellulose manufacture, by Edwin Sutermeister, p. 15-16; Grinding conditions affecting mechanical pulp, by McGarvey Cline and J. H. Thickens, p. 20-5.
- Paper, Oct. 9, 1912.—Water powers and forests of Wisconsin, by Chas. R. Van Hise and E. M. Griffith, p. 20-3.
- St. Louis lumberman, Sept. 15, 1912.—Timber resources of Arkansas, by Robert M. Hutchins, p. 22-3; Evolution in lumber seasoning, p. 57-8.
- Spokesman, Sept. 1912.—Cottonwood lumber and its progress, by J. W. Darling, p. 575-7.
- Timberman, Sept. 1912.—Canadian forestry association holds 14th annual convention, p. 24-40.
- United States daily consular report, Sept. 16, 1912.—Lumber market in Smyrna, by George Horton, p. 1403.
- United States daily consular report, Sept. 18, 1912.—Shipping Jamaican hardwoods to the United States, by Julius D. Dreher, p. 1422-3.
- United States daily consular report, Sept. 23, 1912.—New method of working timber in India, p. 1515.
- United States daily consular report, Oct. 9, 1912.—Growing use of Australian woods, p. 172.
- Wood craft, Oct. 1912.—Clock cases; their design and construction, by John Bovingdon, p. 10-14; The olive wood of West Africa, by Charles Davis, p. 23.
- Forest journals*
- Allgemeine forst-und jagd-zeitung, Aug. 1912.—Neuere erfahrungen über die anzucht einiger juglandecen, by Rebman, p. 257-74.
- Allgemeine forst-und jagd-zeitung, Sept. 1912.—Plenterwald, by Martin Wernick, p. 293-310.

- Boletín de bosques, pesca i caza, July, 1912.—Cortezas i taninos, p. 14-16; Las lecciones que se deducen de las inundaciones del Sena en Francia, p. 54-58.
- Boletín de bosques, pesca i caza, Aug., 1912.—El ciprés de Monterey, o *Cupressus macrocarpa*, by Federico Albert, p. 73-87; Algunas definiciones silvícolas, by Ernesto Maldonado, p. 87-93; El servicio forestal en Rumania, by Federico Albert, p. 106-9.
- Bulletin de la Société centrale forestière de Belgique, Sept. 1912.—Le boisement et le défrichement des terrains incultes dans la province d'Anvers, p. 524-32; L'exploitation forestière au Congo belge, p. 532-9; Expériences sur les essences exotiques en Prusse, by A. Schwappach, p. 539-48; Les arbres fétiches, by H. Frick, p. 566-8; Le bois de hêtre, by Louis Testart, p. 568-72; Le sucre d'érable au Canada, by H. M. Nagant, p. 574-5.
- Forestry quarterly, Sept. 1912.—Standardization of instruction in forestry, p. 341-94; Ranger schools, by Henry Solon Graves, p. 395-8; Forest assistants in the Forest service, by Theodore S. Woolsey, p. 399-401; Teaching students how to conserve energy, by S. B. Detwiler, p. 402-6; The application of scientific management to forestry, by Karl W. Woodward, p. 407-16; European study for foresters, by A. B. Recknagel and Theodore S. Woolsey, p. 417-39; Forest types of Baden, by E. C. V. Gilman, p. 440-57; A method of investigating yields per acre in many-aged stands, by Herman H. Chapman, p. 458-69; Forestry on Indian reservations, by J. P. Kinney, p. 471-7; Utilization at the Menominee Indian mills, Neopit, Wis., by Nelson C. Brown, p. 478-83; A working plan for western yellow pine lands in Central Colorado, by P. T. Coolidge, p. 484-94.
- Indian forest records, 1912.—Report on the investigation of bamboo as material for production of paper-pulp, by W. Raitt, p. 1-37.
- Indian forester, Sept., 1912.—Silvicultural research from a financial standpoint, by R. S. Troup, p. 429-36; Fire protection in the tropics, by H. C. Walker, p. 436-52; Forest fires, by R. S. Pearson, p. 452-5; Some facts about camphor, by Ambrose Warner, p. 485-9.
- Revue des eaux et forêts, Sept. 1, 1912.—Cylindrage mécanique des routes forestières de la Joux, by J. Thiollier, p. 513-16; Le mouvement forestier à l'étranger; Finlande, by G. Huffel, p. 518-9.

INDIA'S GREAT FORESTS

The hill forests of the United Provinces and the Punjab in India hold very extensive stores of spruce with which is associated the well-known silver fir. Both these species yield timber somewhat similar to the European deal, which is used for planking, tea boxes, packing cases, and shingles. If creosoted the timber should be suitable for railway sleepers. It would yield enormous quantities of cheap planking, and there is little doubt that the wood both of the Himalayan spruce and silver fir would be excellent for the manufacture of matches and for paper pulp. The trees grow to a very large size, with a girth of 20 feet, and a height of 200 feet is by no means uncommon.

AUSTRALIA'S IMPORTATIONS

During 1911 Australia imported from the United States timber valued at \$13,850,000, compared with \$10,470,000 during 1910. During the earlier year that country exported timber valued at \$4,840,000, compared with \$5,105,000 during 1911. Of the forest products imported during 1911 wood and manufacturers of wood imported from the United States amounted to \$9,658,282, compared with \$8,786,580 in 1910.

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RIVER DRIVING

BY W. R. BROWN

THE latter part of April is a time of suppressed excitement from the general manager down to the last "river hog." At almost any moment over the 'phone may come a call from some camp watch far up in the wilderness that the ice is going out, the streams are opening up and there is a good "driving pitch" or "head of water" bank full, which means that the logs can be floated and men should be rushed to take advantage of the freshet. Word is quickly passed to walking bosses, clerks, toters and wanging men, and the various foremen start their straw bosses on a hustle through the boarding houses and saloons known as "blind pigs," to gather up the "white water" men for their particular "wanging," and straighten out many a timber jack, who for the last two or three weeks, since returning from the winter camps, has been industriously liquifying his roll. As rolls are by this time scarce, and borrowing precarious, it is now only a question with "Jack" whether to go with the short drive as a "river hog" or "joker," and so return in the minimum time to the Elyseum Fields, or hire out as a crackerjack "white water" man on the "long route." Meanwhile a warm April drizzle falls from under a leaden sky, and the news spreads like "pay day" that there is good driving on Kennebago.

All the previous winter the silent flakes had been piling up a deep blanket of purest white under the thickly shaded hillsides, and solid floors of ice had been accumulating back in the dismal swamps as reservoirs for the coming flood. During the bright, sunny days of March the warm breath of Spring came to

touch and invisibly dissipate the great drifts, and later a series of hot days and warm nights in April breathed deep upon the still white carpet in the green woods, which could almost be seen to settle into a litter-strewn yellowish mass through which roots and stones pushed their heads and the wet branches of fallen trees glistened in the sun. Each complaining, imprisoned stream burst from its wintry sleep in a torrent that rose and fell as the frost of night succeeded the warmth of day, and dashed away to the lakes or rivers below, piling up sparkling walls of ice along each bank. The logs piled in deep tiers on the banks, or across the icy back of the brook, tremble with fettered energy, needing only a touch to send them rolling downstream on the breast of the rising torrent. From the little stream they float to the larger river, possibly across several lakes, and finally, joined by many thousand more from other tributaries, form one large body in the still waters above some mill. To gather them all safely in fills two exciting months of the river driver's life, and the moment for departure is eagerly awaited.

The expert driver is an interesting but disappearing type of American frontiersman. He first is seen as he sallies forth from the company's store, where he has been trusted for an outfit, sporting a pair of laced shoes with long caulks or spikes in the soles, to give a footing on the rolling logs; heavy pants not yet "staggered"—that is, torn off below the knee to afford greater ease in running about over the logs—and held up by a brass-studded belt; a red flannel shirt and felt hat, a meal sack



MEMBERS OF A FRENCH AND INDIAN CAMP CREW.

thrown over one shoulder with a change of "dunnage," and a copious pipe to complete the outfit. The meal sack, known as a "Kennebecker," because first used on that river, contains two small potatoes, one in each corner, around each of which and the mouth ropes are tied to form a knapsack. This is filled with what is known as "wagin," a change of clothes, and those of Johnny Cannuck are soon surreptitiously overhauled by the cook to confiscate the offensive and evil-smelling tobacco, which the native Canadian delights to raise and smoke and which, it is said, will locate him for miles.

The drive finally takes its start from the front of the company's store in a long farm wagon, across the sides of which boards serve for seats and which is soon crowded to overflowing with forty or fifty river drivers. With a great crack of the toter's long whip, the six heavy horses start with it up river, a tardy candidate appearing at the eleventh hour and racing wildly after the disappearing van, helped on by the

efficacy of many waving bottles. Hilarious and pugnacious, the crew rolls along for a day or more, by farm land and settlement, until at last at the "Jumping off" place, a sobering walk of fifteen miles through the melting snow knee deep, brings them to the "landing" or scene of work, where is either a deserted winter logging camp, or a few white tents pitched in the snow around a roaring fire.

Here what is known as the "rear" is started. Many tiers of logs, rolled ten deep, have been piled, end for end, down the bed of the brook, through and under which the rising water gurgles and roars, and it takes but little loosening to send glut after glut quickly on its way down the stream. This is comparatively easy, and the qualities which go to make up the real river driver do not appear until a clear channel is effected and work upon the open water begins. Then latent forces come into action; each man's skill and experience is at the test in contention with the might of nature; courage is opposed

to chance, and the ever-hovering sable wings of death. A day with the river drivers at this time may be full of incident, and we have chosen as characteristic, and the cause of much comment, a race between the Swift and Dead Diamond drives in the year of 1900.

It was betimes that gray morning that we rolled over in our warm spreads to the prolonged and artistic "T-U-R-N O-U-T" of the "cookee," that omnipresent assistant to the cook, which would have shamed the Angel Gabriel, as it swelled out into a high-pitched scream.

Outside the big open fire was crackling loudly, and the gruff comments and yawns of the men mingled with the rattle of tin dishes. Although assured of the lateness of the hour by the tin clock in the cook's tent, we could just see a thin, white streak of dawn growing visible in the starry heavens above the black cathedral spires fretting the ridge of the eastern hills. This incident of the clock, set ahead quietly by the cook the previous evening, although time-

honored and well known to all, evinced on the part of the boss the evident desire to avoid the appearance of crowding, but did not prevent a thin, gray, crescent moon from throwing her frosty light over a scene not lacking in the elements of the picturesque. Our tents had been pitched in a gorge between two hills which rose above us, silent and mystical in their primeval forest vastness. The little river, in dim outline beneath us, flowed through a now disused dam, whose posts and piers were faintly visible in the silvery mist between the cliff walls, where the water gurgled and boiled. Our tents, four in number, stood around an open fire, each shining white and faintly luminous, like some spectral thing, by the dim rays of a single lantern. In sharp relief, and ruddy against the fire, the various pots and kettles of that autocrat, the cook, boiled and simmered on many jointed "S" hooks at various heights above the blaze, while at each side tin bakers filled with browning pans of warm biscuit caught the full glow of the ruddy logs,



A "HEAD" OF WATER FROM THE DAM.



SLUICING LOGS AT A DAM.

and crackling sparks peppered the soft tops with a steady bombardment. At last, with a final shift or two of the pans, to even up each one's share of sparks, that "stomach burglar," commonly known as a cook, with a deft twist, turned each pan upside-down on the board table, and offered for our delectation that steaming creation technically called "sinkers." At this signal to "fall to," the dim forms of the river drivers moved, tin plate in hand, around the fire, seeking their turn at the various pails and pans, a cookee standing meanwhile at each side with steaming kettles of tea to fill their proffered cups, each calling out the while the exceeding great merit of his own decoction over that of his comrade, and embellishing his claim for attention by serving up in fancy all kinds of favorite drinks, both to show their whereabouts in the dark mass of figures and to relieve the tense gloom of the men. Beyond their frequent calls, like guiding bells in a fog, nothing but low murmurs were heard, for the river driver commonly arises stiff and sore

and eats his mince pie with his "hat on." Neither is he given to joking until his sore feet have become accustomed to the stiffened and cold driving shoes in the softening influence of the water, and the boss is at such times sometimes referred to as "Bruin," on account of the growl which he hands out to some would-be deserter in pointed reference to their past, present and future characters and possible condition. That they are stiff and sore is not to be wondered at, for all the previous day they had been waist deep in icy water from early dawn to twilight, and had tramped through the snow and slush in the gloaming back to camp, and, after a hasty change of wet for dry nether garments, had crawled in between the spreads to rest, dry out and sleep all that was possible; which to the tender-foot was not a large item, due to the tuneful notes emanating from the more hardened.

As the river mists lift to the hill tops like a gauzy veil, one by one, the men disappear down the dark road where it wound cavernous beneath the roof of



"BOOMING OUT" AT A DAM.

firs, the sparks fly far up above the trees to mingle with the few remaining stars, and we sit by the fire in privilege alone, save for the now silent cookees, who steal about collecting the scattered plates and dishes, and for a few moments we linger to drink in the wildness of the solitude and the splendid breath of the new day crimsoning the east.

The stream we were driving was called the Diamond, which separates near its mouth into two branches, the Swift and the Dead, the first of which it was our duty to clear, and our endeavor was to drive our rear past the point of juncture before a rival crew on the other branch could arrive. Telephone lines which met at a common central below and ran on trees along each stream, kept us in constant information as to the progress of the other crew, and on the day in question, owing to their equal nearness, a close race was promised. The natural rivalry of the two bosses during many previous seasons brought each of them a fair share of victories; enough to create the

liveliest interest in the success of this drive, and their eagerness spread to the other men in a desire for the first place this year.

Our boss, his beard grey in the woods service, was a short, wiry little man of dynamic energy, and tireless and fiery in disposition and in his treatment of the men. Knowing every rock and eddy in his particular stream, he was like it, quick and impetuous in action, and when stirred to a high pitch, capable of great things but liable to unforeseen rocks and jagged corners. His rival, on the other hand, was immense of stature and ponderous, of equal age, will and experience, but careful and circumspect in disposition, relying more on well-laid plans than on the opportunity of the moment, and well suited to his stream, which flowed deep and still for many miles in a flat and alder country and, when not overcharged with floods, carried the logs evenly and smoothly to its mouth. It was jokingly said of him "that he could run logs on a heavy dew," but should the rising floods swell above the low banks, the logs would, in

every direction and in the most perverse way, twist as if alive and "gill-poke" into every "logan" and estuary.

Both men had a small coterie of old hands who followed their fortunes year by year and upon whom they put the most important work, who tended dam or telephone, watched gorge or eddy, ready to blow up with rend-rock a quick-forming jam, or were to be relied upon wherever especial diligence and alacrity was demanded. With such a nucleus, a various and motley crew had been gathered together, composed of every nationality and color, the body of whom possessed a certain swing and balance that bespoke the woodsman, but inevitably containing some specimens of the "farmer" and "gill-poke" variety, soon to be weeded out by a process of "white water" isolation. The retribution of such incompetents, taken along on their sole statement of ability, was swift and certain when the logs, being all rolled in from the landings on the banks, began to run in quick water and their awkwardness became apparent, or

they were found hugging the shore, not being able to "cuff them out" with the others. Immediately they would be spotted by the irate boss, followed by an invitation to see the clerk about "time," and started with little due them on a long walk back to the settlements from which they had so lately come in teams as "white water," "crack-a-jack" drivers.

We had but four miles to drive to reach the mouth of our stream, and conflicting rumors had reached us over the telephone of the whereabouts of the other rear, sent out apparently to avoid disclosure and lull the immediate activity of our division. But after a careful estimate of the situation, held in front of the fire in the evening, it was decided that to be at all safe, a special effort must be made to reach the conflux of the brooks the following day.

It was given out among the crew that the rival crew would surely be there and that their only hope rested on a few hours. Immediately a messenger was sent off into the darkness to carry



LOGS GOING OVER A DAM ON THE WAY TO THE MILL.



A "WING" OF LOGS.

the word many miles above to the great pond dam to lift all the gates at midnight and allow the imprisoned body of water stored there to rush down in a flood that would reach us by dawn and furnish the power to raise and loosen the tightly snarled "jams" and "wings."

One day alone could be drawn from this reservoir, and that exhausted, the golden opportunity would be lost, so all the hostages possible having been given to fortune and the dim twinkle of the messenger's lantern having danced to nothing among the trees, we at length follow the tired crew and await the events of the coming momentous day.

Not many minutes had we reached the banks that gray morning and the men scarcely taken their first cold plunge, when far above came a long, low rumble on the wind, accompanied by a faint intonation of the booming of logs, and the word was passed around that the "head" was coming. Little by little, the roar of the surging water seeking an outlet increased in volume, and the deeper notes of the great butts resounded like cannon. Up a clear stretch of stream from our vantage

point a thin, silvery line of water glistened first and rapidly grew into a dark flood wall, upon the face of which a seething mass of sticks tumbled over and over and swept everything before them. Loose logs, caught up by the rapidly hurrying water, ran continuously where the current was swiftest and were soon borne to the front as the shores retarded the side water, causing them to outrun the flood itself and charge again and again to the shallows as if taking a fortress.

Instinctively we drew back as this pounding mass rushed by, and then all hands to work with a will on the now floating and impatient "wings," trembling with vibrant energy. Here the men ran, unloading a log or twisting one there, until, of a sudden, the front of the "wing" gave way, and a quick scramble for shore ensued from off the moving pile as it slowly unrolled in the quickening water. Often there was not even time to reach the shore, and a few were seen performing to the best of their ability a lively sample of footwork on the largest stick obtainable, their cant-dog used for a balancing pole and

carried rapidly perforce downstream, until some favoring eddy offered a quick jump to the shore. Or often a "center" being loosened from off a sunken boulder, a man or two would be left, knee deep, on a pedestal of rock, unable even to turn around, and obliged to stand there for long minutes like disconsolate cranes, waiting with what patience he possessed the arrival of the bateaux and rescue.

A great shout and laughter goes up from the men on shore as some unlucky fellow rides by, his log rolling quietly back and forth as it runs through the curling waves, and many sallies enliven his interest to keep uppermost, such as requests for dry matches, to close the door after him when he goes in, or carry their respects to the muskrats, etc. One man who persisted in wearing a derby hat, because he claimed it shed water better than the usual felt, was soon called "Beaver" from the spectacle he presented when, having lost his balance and gone in off a breaking glut, nothing was visible of him but the crown of his hat bobbing along on the waves toward the bank. Many a narrow chance is taken by such men when, clinging to some log, they are drawn swiftly sideways upon a "wing" and, taught by experience or observation, extend full length upon the top of the water to avoid the under-tow, which would draw them in, as it often does some poor fellow, never to emerge again until the "wing" is rolled away. In such a case they shoot out over the top before the oncoming logs crush them as in a vise. In a predicament of this kind a certain wag of the camp, being in a condition of equal instability and jollity, came up beneath a floating log so that his head and feet protruded on each side. As the men hastened in the bateau to extricate him from his dangerous position, he sung out to them: "Never ye mind me, but ketch that poor devil standing on his head there beyont." In the stiller water downstream, where loose sticks float during the night and form in gluts, deer have been found strangled by the oncoming logs while attempting to swim across.

It is the danger that gives zest to the

work, the fascination of meeting and conquering Nature in her wildest form, a comradeship with the tree on its last long journey to oblivion, that calls to the woodsman each spring with an inexplicable power, once felt, never wholly to leave, like the thrill of the Alpine climber or the control of great speed. Many an expression betrays this as the loneliness of the river after the logs are gone or the cheers and excitement in the running. This tenseness of interest carries men along without fatigue for many hours, unconscious of their exposure in the interest of the advance, and end being always in view, while constant opportunities for forwarding the whole body in brilliant individual work appeals to their personal pride. It is this tendency to do something brilliant that has constantly to be checked in operation for the surety of combined effort over spasmodic, unorganized work is nowhere so evident. A good illustration of this was going on before us. From bank to bank the stream was full for some hundred yards back with a tight tangle, and near the shore, to one side, a crew of ten men were quietly working as one man under the experienced leadership of a subboss. Arduously they worked a channel along the shore, although here the logs lay dry and hard. Out in the center, where the whole mass was a tremble and gave every appearance of breaking apart in a moment, two men were trying first one log and then another, seeking the key which held. For a moment they seemed successful as the jam settled, only to come up hard again on the selfsame obstruction, till, of a sudden, a cheer broke the air from the men at the side, and, sighting over the top of the pile, it was seen to be slowly moving downstream, and the heaping logs, wedged together in a "nose hole" until now, flattened out to the sides in the channel, and shouting to "keep her going," all together the men pushed with might and main and used their cantdogs for bunters between shore and the edges of the squeezing and groaning raft, till at length, due to the gathering momentum, all uncertainty was over, and onto the broad



LOGS ON THE ICE JUST BEFORE THE SPRING FRESHET.

back of the jam, some of the men, to celebrate their victory, like their Indian ancestry of old, danced up and down with yells of triumph before running for the shore.

Our force was divided into two equal crews to take the rear on each bank, and a shout would be exchanged across the water as one crew passed the other and obtained temporary advantage. Behind all, in a bateau, the "rear" boss, with a long pole over his arm, caught any straggling logs and rescued any stranded men and was relied on to leave the shore clean as he passed.

About eight o'clock, on a small promontory which commanded the river, a thin column of smoke was seen ahead, showing where the "first lunch" was pitched, and the clarion tones of the cookee, in a prolonged tone, echoed, first up and then down stream, for "Lunch-o-o-o-n," and at once, from far and near, his cry was carried along the turns until the farthest man "tending out" received the welcome news. Wonderfully quick over logs and through swamps, the men made their way to where the steaming kettle of beans and the buckets of biscuits and sweet-

stuffs formed an inviting circle to their hungry gaze, and, with hands and tin plates heaped high and a cup full of tea from the kettle of the ever-circulating cookee, they throw themselves on the ground and enjoy to the full a few minutes of rest and the satisfaction of a ravenous appetite. Then, when a pipe was lighted and well going, the boss first and the most ambitions second, shoulder their cantdogs and file off again to work.

We had come two miles since early dawn. Below was Ellingwood Falls, a long, narrow gorge for a quarter of a mile or more, whose ragged cliffs rose sheer from where the water ran swift as a sluice, and ragged boulders and sharp turns, made famous for jams, ended in a flat shallow at the foot. Upon this, up-ended and bunched, logs hung and gathered and refused to be floated. Years before, "abutment sheers" had lined the way and an "apron dam" or two across some ugly pools had served to mitigate the worse places, but most of these had long since rotted or worn away, and, all together, it was an ill-omened and treacherous place. Tradition had it that one drive,

before the days of telephones, had been "hung" upon a jam at the foot, while a messenger was on his way above, filling the whole length with a tangled mass, and before it could be picked apart a good week had slipped by, together with the best of the spring water, and the bleaching logs had to be "hung up" to await the return of another year.

A few, only, of the men were chosen to "rear" this difficult part, while the rest went below. This was a fine place to watch the more expert and adventurous. A quick and, for the moment, exciting incident occurred before us which was the means of saving one unlucky man's life, but otherwise unnoticed by the principals. A driver was out alone in some particularly rapid water upon a "center" putting down a charge of dynamite tied to a long pole. He had lighted the fuse, about a foot long, and estimated to give him time to retreat, and had jammed the sputtering

stick to its full length beneath the tangle and turned to run for the shore, when, by some mischance, his foot slipped and he sprawled full length upon the quivering timbers. We expected each moment to see him go skyward above the heavy charge, when, like a flash, a short Irishman, named Crowley, made a desperate leap to the jam, caught him as he ran by the collar, jerking him to his feet, and together they barely reached the shore when off went the charge, throwing up great junks to the tree tops and raising a perfect geyser of water. The jam lifted as if alive and rushed pell mell downstream, while unconcernedly, as if nothing happened, the two men turned to the woods and sought a crossing below. If thanks were ever extended, it was probably in the settlements later, when the little Irishman himself, strapped, might live for days or weeks on the good-will of his comrades, for Jack is commonly altogether free-



LOGS ARRIVING AT A SAWMILL AFTER THE RIVER TRIP.

handed when off duty and believes in a short life and a merry one.

Our advance guard had done their work well, and the thin walls left at the front, where the wings had lain, crumble at a touch and vanish downstream, so that, after an hour's hard work, this difficult part of the river was clean and the forward march taken up again with new vim. Hardly from this point could we follow the winding shore or detour around some intercepting bayou fast enough to keep abreast of the moving "rear," and after an unusually long advance, would come out upon some point where a long view was to be had of the river, only to see far above us a thin line of forms filing along the shore like Indian warriors, partially hidden in the intercepting foliage, or again, on nearer approach, like their enemies, the stern Puritan musketeers, marching with matchlocks over the shoulders, as the cantdogs shone in the sun.

The long shadows of the pointed firs were creeping fast up the eastern bank of the stream when the rattle and clasp of the camp outfit is heard approaching through the stillness of the evening wood. Soon it drew in sight, piled high and well corded upon a large dray, sounding along the road to the merry tinkle of the pails and pans and passes us drawn by four straining horses. The men exchange shouts with the "toter" and a retinue of camp followers, whose appearance augured well for the advance, nor could they now turn back, for was it not to be set up at the very mouth of our stream and goal of victory? Following it ahead to the forks, no immediate sign was seen of the other drive but a messenger who had been sent ahead secretly as a scout reported them at great endeavor not far away. Thither we turned to estimate chances. Their progress had been slow but sure. Each winding turn and "pole logan" had been systematically searched and the logs therein gathered into rafts, towed out and sent adrift in the main channel. Their certainty of arriving that night had been figured out to a nicety and no possible chance was supposed to have enabled our division so to do. But now that we were known



SHEER LOGS.

to be approaching, the inert logs moved all too slowly in the meandering water, and the alders held back stray sticks with pernicious obstinacy, trying to the patience and spirit of the men. Near the mouth, a widening of the stream at the turn of a bend formed an immense eddy where the logs swing round and round in a circle, and six boats were feverishly engaged at this time in trying to sweep this maelstrom. Every time the great mass swung around two men jumped from each boat onto the logs at the outer edge and gathered as many together as could be reached and bound with the long pick-poles, while the crew in the boat waited expectantly on their oars until all together, at the command "head boat," they churned the water to foam to tow out their small glut from the vortex and guide it down stream. For a critical moment, each boat, as it came around in succession, hung in a balance against the might of the current and the slightest turn of a stroke determined their separation. High up on the bank at one

side the boss was standing to direct the movements of all six boats and to facilitate their co-operation with shouts of encouragement and fierce denunciations of failures. His customary reserve had deserted him, and minus coat and hat, he was intent on every movement, waiving his arms and occasionally enlarging the English language in a rich and poignant manner.

Returning to the forks we watched the small encampment rise as if by magic, the six-foot fire logs drawn together and lighted, the rolls of spreads untied and stretched out inside the tents and the many small kitchen utensils unpacked and made ready for immediate use, while the neighing of hungry horses, the barking of dogs and the rattle of dishes woke the evening echoes to a lively scene. Turning from the blazing fire we now heard the sharp click of the striking cantdogs above on our stream and the lusty shouts of the men who were soon abreast of us as they rolled in the last logs by the faint light of the evening glow and the fire's uncertain gleam, and at last, wet and thoroughly tired but exultant, they swarmed about the fire for their last supper on the drive, nor did the crew

above on the rival drive care to descend until we had well moved away in the morning. The gathering darkness had made further work on the eddy impracticable and it must needs be left to soak itself clear during the night.

For this meal extra rations had been set out by the cook, to which was added great basins of milk from a neighboring farm and all else in abundance that ingenuity could suggest, and upon the arrival of the "rear" boats, racing at top speed to the landing, for the last time the clear notes of the cookee sounded the invitation to "turn to" which was immediately and unanimously accepted. For a time all was in confusion as each man prepared his gunny sack for an early start in the morning or exchanged congratulations or plans with his comrades, but as we smoked far into the night with the boss, one by one the men crept to their tents, until the last form to break the stillness of the scene after all others had turned in, was the bent form of the clerk, painfully writing on the top of a soap box by the dim light of a dripping candle, upon which rested a table of wages and a small bottle of ink.

FIRE LINES DESPITE THE LAW

NOTWITHSTANDING the injunction issued by the Court of Chancery last spring restraining the New Jersey State Forest Commission from enforcing the so-called "Railroad Fire Line Law" the three railroads having the greatest exposure in the State have voluntarily undertaken to extend their lines during the coming winter. The Pennsylvania Railroad Company will make new lines on the Freehold and Jamesburg Branch, on the Long Branch Railroad, and on portions of the West Jersey and Seashore System. The New Jersey Central Railroad Company will make lines along the New Jersey Southern Division south of Lakewood. The Atlantic City Railroad Company will extend its lines in Gloucester, Atlantic and Cape May counties. All three roads will also do considerable work in cleaning up and

making effective the lines that have been constructed heretofore. The length of fire lines now in service on all railroads approximates 250 miles. The increase this year will probably raise the total to at least 300 miles.

It is rather remarkable that this law which has been declared unconstitutional should still be so effectively supported by the very parties against whom it was directed; that is, the railroads which endanger the forests of the State. The Forest Commission expects that the decision of the Court of Chancery will be reversed by the Court of Errors and Appeals. Such a decision is earnestly hoped for as a means of enforcing the provisions of the Act where less liberal minded or less far sighted railroad companies are concerned.

PAPER MILLS AND FORESTRY IN CANADA

BY ELWOOD WILSON

SO little is known of Canada in Europe and the United States, and so vague are the ideas regarding this wonderful country, that it may not be amiss to give in a few words some description of it. While far larger than the United States, its habitable portion is comparatively small, although this, through modern engineering enterprise, is rapidly growing, the hardy pioneer pushing forward his railway lines and establishing himself where civilized life seems hardly possible. As one passes from East to West the habitable zone rapidly widens from a narrow strip on the inhospitable Labrador coast, fifty to a hundred miles north of the St. Lawrence in Quebec, gradually growing through the prairie regions until in British Columbia it stretches 1,000 miles, almost to the Arctic circle. Stunted, almost worthless timber in Labrador, immense forests of medium-sized conifers mixed with hardwoods in Quebec. Large spruce and great forests of white pine in Ontario, treeless prairies and forests of poplar through Manitoba, Saskatchewan, Alberta, and, finally, the magnificent forests of British Columbia to the Pacific.

Of all the provinces which form the Dominion, Quebec is in many respects the most interesting, representing as it does one of the oldest civilizations on the American Continent, differing from its sister provinces in language and religion, and retaining traces of the old French tongue and medieval customs. Three-quarters of the population are French, and the majority of these farmers, "habitants," who earn their living in the winter by working in the woods. Along in late August and early September, when the crops are all gathered in, they go to some one of the big lumber or pulp companies and make a contract to cut and haul so many thousand logs 13-15 feet long. This is called jobbing and the man a jobber. The

jobber takes his sons, if he has any over fifteen—if not he hires a man or two—takes his horse and sleighs and, sometimes, even his whole family, and goes off into the woods, frequently a hundred or more miles from home. Here he gets provisions from the nearest Company depot, and, building a log camp, walls, roof and floor all of logs, he settles himself for the winter. The camp has one room for the people and one for the horses, sometimes all are in the one room. Bunks of poles are built along the wall, two or three windows about 2 feet by one, are cut in the walls, a rough table and a couple of benches are hewed out and a big iron stove set up. Here the jobber spends the winter, cutting and piling logs until Xmas, going home then for his "devoir," as commanded by the Church, having a jolly time with friends until "Little Xmas," and then back to haul his logs on one-horse sleighs to the nearest lake or river, and going home in March.

In the days of the lumberman this was all, but now have come, dotted here and there like islands throughout the province, the pulp and paper mills, offering indoor labor, bringing in new ideas, founding towns and bringing modern "civilization," which, while not an unmixed blessing, is progress and is bringing light into a darkness almost medieval. The first requisites of a pulp mill are water power—no other can grind wood profitably—a plentiful supply of clean water and a river to carry the logs on their long journey from the forest to the mill, covering, in some cases, two years. So the mill must locate beside a waterfall, and as these occur in most out-of-the-way places, towns of one to five thousand souls have sprung up in the heart of the wilderness. As the entire personnel of such companies must be brought in from other places, it is necessary to



GRAND MERE VILLAGE IN 1903.

provide enough of the comforts and conveniences of modern life to keep them. Some of the mills have given just enough, but the wiser ones have gone much further.

As wood of coniferous trees is the raw material of pulp and paper, these must be an abundant, accessible and sufficiently cheap supply. All of the larger mills, therefore, own their own forests, but not absolutely, and here it is necessary to explain the wonderfully advantageous position of Canada from the standpoint of conservation. All lands in Canada, as originally in the United States, belonged to the Crown, and while in the latter the Government after the War of Independence, in the effort to encourage colonization, parted with them carelessly and recklessly, by wise foresight, Canada acted differently. Here the land is divided into three broad classes: farming land, forest and mining land, over which the Government retains all rights, as well as over water powers, hunting and fishing. An ideal situation were it carefully carried out, and it is, as a general rule. Land fit for settlement is sold on very low terms and easy payments to the settler, who must, however, clear a certain amount of land each year and build a

house. Licenses to mine, to cut timber and to hunt and fish are sold to the highest bidder at auction, and so long as he pays his annual rental and complies with the Government regulations, he is left in undisturbed possession and may sell his rights or will them to his children. The Government demands an annual rental of \$5.00 per square mile per year, the protection of the forest from fire and a tax of \$1.30 per thousand feet, board measure, when the timber is cut. At first the Government protected the forests from fire itself, charging a fire tax, but this protection was so poor, owing to inefficient organization and too much politics, that the licensees petitioned to be allowed to protect their own lands at their own expense, and this request was acceded to. The licensees choose their own rangers, who are commissioned by the Government. This system has worked well, but has been further improved by all the owners of licenses forming an association, which protects the limits. The association is the largest on this continent, representing over 7,000,000 acres of timber lands. Rangers on gasoline speeders patrol the railway lines, following all trains, and crews of two men each, with tent, canoe and camp-



GRAND MERE FALLS. LAURENTIDE COMPANY'S MILL.

ing outfit, patrol the rivers, which are the only highways through the wilderness. One lookout station has been built, and the coming season will see several more finished and a number of miles of telephone lines also. The cost for the season has been a little more than one-quarter of a cent per acre, and it is hoped that a more liberal appropriation can be secured. The Quebec government, through its Minister of Crown Lands, Mr. Allard, has been most sympathetic with this work and has agreed to contribute \$3,000 toward its cost for the current year.

The forestry policy of this province has been an advanced one. For many years there has been a diameter limit below which no one was allowed to cut, and a law has been on the statute books giving anyone who plants an acre of land in trees the right to choose Government lands which may be for sale to the value of \$12.00. About eight years ago the Premier chose two young French Canadians and sent them to the Yale Forest School, and then to study in Europe. After completing their

studies, he established a Department of Forestry, placing them in control, and they have organized this work and made considerable progress along forestry lines. As there was a great lack of trained men, especially those who could speak French, a Forestry School was established as a branch of the great University of Laval in Quebec, and the students are given their practical experience as Government rangers and inspectors during their course and after graduation are given higher positions.

A forest nursery has also been started, where the students have practical training in planting work. In some sections of the province, there are considerable areas of sand dunes, and these will be planted up as rapidly as possible. The great need is for men with some training in forestry who can travel in the woods. There are few sections on this continent where traveling is so difficult. The only avenues are the rivers, with the lakes which empty into them, and the former are filled with rapids which make the descents dangerous and the swiftness of



THE LAURENTIDE COMPANY'S OFFICE AND SHORE 1903.



GRAND MÈRE IN 1903.

the current makes the ascents most toilsome. In running rapids much experience is necessary, and many lives are lost each year in trying them. As the old trappers die out, few men go into the woods very much, and it is almost impossible to get enough woodsmen to act as fire-guards and forest rangers. The present generation of natives are going to the towns and into the factories, and the forest no longer calls to them as to their forbears. So the only hope of building up a corps of men to care for the forest lies in establishing ranger schools for natives, which will fit the men for their work, giving them training in woodcraft and inculcating an *esprit de corps*, paying sufficient wages to make the work attractive. This will cost money, but the Government can well afford it, and it has certainly been proved in every industry that men who are satisfied with their pay and well cared for will turn out much more work than dissatisfied under-paid hirelings whose only object in life is to loaf on the job.

All the problems mentioned above which confront the Government, must also be solved by the licensees of timber lands, and of these the only ones who can possibly solve them satisfactorily are the large companies who have sufficient investment at stake in large plants to make it worth their while. The holder of a small territory who sells his cut or who owns a small temporary sawmill cannot afford to do anything but exploit his lands and get his return from them as soon as possible. But with the large companies, with millions of dollars invested in plants which are entirely dependent on their holdings for their raw material, the situation is entirely different. They must take care for the future. Here in Canada, as elsewhere on the American continent, this is just beginning to be realized, and, up to eight years ago, everyone acted as if the supply of timber was inexhaustible. You heard of the "inexhaustible timber supply," "our rich resources" on every hand. The most accessible timber was cut, the waste was prodigal, and fire was allowed to run unchecked. "Why, we have always had fires." "We can't afford to fill the woods with men."

"We have timber enough to last forever." All this in spite of the fact that the country is dotted with the evidence of past conflagrations. One fire about thirty-five years ago completely destroyed the timber on over three hundred square miles in one section. The situation was indeed a difficult one. Owing to the vast areas and the difficulty and expense of travel and the rigors of the climate, no maps had been made. The main rivers and large lakes and some of the timber holdings had been mapped, but only in the roughest way, and no holders knew about their lands. The only people who knew anything were a few old foremen and woods bosses who had traveled the country and knew their way around and had a vague idea about what particular sections would yield.

About 1895 a small pulp company was formed to operate a fine water power on the St. Maurice River called the "Grand Mere," from the fact that right in the middle of the fall there is a rocky island which shows very distinctly the profile of an old woman. There is an Indian tradition of a maiden who waited for her lover until she became old and grey and then was turned into this rock. This company built a small village in the forest and commenced operations. The town was a long way from civilization, communication with Montreal and Quebec, the nearest cities, was difficult, as the railroads were in shocking condition, and in winter one never knew how long it might take to cover the eight-six miles to Montreal. It took three days once, and it was always wise to take snow shoes, so as to be able to get to the nearest farm house for food. The employees of the company lived in little frame shacks and had no conveniences and mighty few comforts. Things also went very badly financially, and about 1903 the company was reorganized. The new manager realized that the first necessity was the comfort and well-being of the employees, and, as soon as he had gotten the company a little on its feet, began to build up a model village. When one realizes how much in advance of the time such an idea was and what it meant to change over and

build up a whole community, most of whom were of the most primitive type and who spoke a different language and were naturally distrustful of strangers and strange ideas, it seems a large undertaking, and it showed broad-mindedness, idealism and courage of the highest type.

The first step was to put the village in sanitary condition; sewers were built, a plentiful supply of pure spring water was obtained, and a hospital was built. The town had been a hotbed of typhoid fever, but in a year this was stamped out. It was necessary to discharge laborers occasionally because they would persist in drinking the polluted water. Then housing and office and mill conditions were improved and opportunities for recreation were provided, bowling alleys, tennis courts and a skating rink. The younger men were encouraged to form hockey and baseball teams, and the success of the hockey and tennis teams in winning championships has done much to rouse local pride and to bring the people to united effort for the good of the place. Probably the most important improvement was a school. This is open to all the citizens and is fully equal to the best public schools in the United States, with an excellent kindergarten, and a manual training course for the boys and sewing classes for the girls. Then the improvement of the village was begun. A landscape architect was engaged and a plan for a "village beautiful" prepared. Old and unsightly buildings were torn down, roads were laid out and macadamized, concrete sidewalks were built and beautiful elms planted along the roads, and masses of shrubbery placed where they would add to the general effect. Vines were planted on the buildings, and many buildings which were inharmonious were remodeled.

The social and spiritual sides of life were not neglected, aid was given to the struggling mission churches, and the people were encouraged to get together for the mutual good. One of the most helpful things was a founding of a branch of the Victorian Order of Nurses. There are two great events of the year when all gather for a general good time—the "Christmas Tree" in the

winter and the "Clam Bake" on Labor Day.

A beautiful park was laid out in the center of the village, and here on summer afternoons and Saturday half holidays everyone gathers to watch the tennis matches. The park is not only good to look at, but gives the children a safe and healthful playground. A club with reading and assembly rooms, gymnasium and billiard rooms, is open to all and during the long winters is used for dances, amateur theatricals and concerts. Then labor conditions were immensely improved, working hours were shortened, guards were installed to prevent accidents from the machinery, wash room and sanitary lockers were provided, sanitary drinking fountains placed at convenient points and lighting and ventilation much improved. In summer the daylight saving plan is in operation, and the employees are free at four o'clock and have the long summer afternoons for healthy outdoor sports.

In 1905 the forestry question was taken up, and the immense holdings of the company, over 2,000 square miles of timber lands, were investigated with a view to introducing practical forestry methods. Accurate surveys of all the company's holdings were commenced and have now been completed. The maps show all topographical details, the location of all burns, swamps and timber, and the areas in the different types of the latter, and all lumbered areas. Stock has also been taken over a large part of the forest lands, so that the amounts and kinds of timber which may be cut are known. Volume tables have been prepared, the first for Canadian trees, and growth studies made of the different species. In 1908 the company began to plant, beginning with 5,000 trees, and plantations have been continued. Last year a small nursery was started, and this has been enlarged this year and will be still further developed. Experiments are under way with different species, in the hope of finding a tree which will be suitable for pulp and will grow faster than the native ones. Norway spruce is naturally the first to be tried. When this problem is settled

all the company's waste lands will be planted.

In 1908 the company started the first efficient fire-protection system and in 1909 persuaded the licensees to unite for the protection of the timber lands along the right-of-way of the new National Transcontinental Railway. This was the beginning of the Protective Association mentioned previously.

In addition to engaging a forester, the company put a forest engineer, Mr. M. C. Small, in charge of its logging operations, and under his efficient management an enormous amount of waste in the woods has been eliminated in the way of high stumps and large tops, burnt timber has been utilized, young growth better protected, better conditions for scalers and more careful methods of measurement. Roads have been opened up, telephone lines have been built, gasoline launches placed on the large rivers and comfortable quarters built for the men in charge of depots and for the inspectors and scalers. The logging department has instituted the first system of competent

logging inspection ever tried here, and this season is trying the experiment of marking trees and lopping tops under competent supervision. "Scientific Management" has been in use for years, and the cost-keeping system of this department is a model.

The employees have also been given an opportunity to subscribe to the stock of the company and have taken advantage of it, and each one feels that he has a deep personal interest in its success.

The influence of all this work has been felt in the surrounding towns and country, and other companies have been encouraged by it to make a beginning along the same lines.

The work of this one man, with a big idea, the infection of which has spread to all whom he has associated with him, has borne most abundant fruit, not only in social betterment, better living conditions and higher standards, but in greater financial prosperity for the company, which has made a record in earning capacity and values.

MR. JOHN E. RHODES' NEW POSITION

John E. Rhodes, of Tacoma, Wash., a member of the editorial advisory board of American Forestry, will, in January, become the manager-secretary of the National Lumber Manufacturers Association with headquarters at Chicago. It was recently decided by the Association to combine these two offices and Mr. Rhodes succeeds Manager Leonard Bronson and Secretary George K. Smith, who have so ably filled the positions for some time. Mr. Rhodes, who is thoroughly conversant with the lumber business, having been in it for a number of years, is at the present time visiting the chief lumber trade centers of the country, ascertaining the sentiment of the lumbermen and the nature of the work which they desire the association to do in their interests. Having thoroughly sounded them he will be in a position, when he takes charge of the work, to develop a comprehensive campaign, which with his great energy to direct it will certainly be carried to a successful conclusion.

TEACHING FORESTRY TO CHILDREN

The New York State College of Forestry at Syracuse University, designated and established by the Legislature for educational work in Forestry in New York, has sent a letter to the principals of all the high and preparatory schools of the State offering to give illustrated lectures and demonstrations upon Forestry before the schools so that every child in the State may understand what Forestry is and may learn to love the trees and forests.

CLEVERLY ADVERTISING BIRCH

The Northern Hemlock and Hardwood Manufacturers Association is sending out a very attractive book on the value, uses and beauty of birch together with a sample of birch wood, the two making a decidedly good advertising feature. The book comprises sixteen pages, handsomely illustrated, and showing plans, exteriors and interiors of buildings in which birch is used as well as a number of styles of birch finish.

MUNICIPAL FORESTRY

By NELSON C. BROWN

Photographs by H. P. Baker and the Writer

CONSERVATION has become immensely popular in this country. From the initial subject of forestry it has been broadened out to cover nearly every conceivable resource—not only the forests, minerals, soils, etc., but health, human energy, and almost everything else which we can associate with the term conservation. Real conservation is beginning to be practised with our forest resources. Not only has the Government taken up the practice of forestry on the timbered regions of the public domain now called National Forests in the West, but many of our states, realizing the impending

scarcity of the lumber and wood supplies, have taken steps to set aside forest reserves. Lumber companies are following these examples and are abandoning their short-sighted policy of stripping timber without regard to the future. It will not be a great while before our more progressive cities will gradually take up the practice of forestry on extensive parks, reservoir watersheds and on nearby waste lands. Already a number of cities have appointed city foresters to look after the care of ornamental shade trees along the streets and in the parks. Some of these positions include the management



HEADQUARTERS OF THE SYRACUSE CITY FOREST, SHOWING A PORTION OF SKANEATELES LAKE AND THE HIGHWAY, BOTH OF WHICH WILL BE UTILIZED AS MEANS OF TRANSPORTING THE PRODUCTS OF THE FOREST TO MARKET.



LOOKING OVER SKANEATELES LAKE FROM THE SYRACUSE MUNICIPAL FOREST. THE LARGE TREES IN THE FOREGROUND ARE OLD VIRGIN HEMLOCKS.



LOOKING FROM THE FOREST OVER SKANEATELES LAKE, THE SOURCE OF WATER SUPPLY FOR SYRACUSE. IN THE FOREGROUND ARE OPEN AREAS WHICH WILL BE PLANTED TO WHITE PINE, SCOTCH PINE AND NORWAY PINE.



A VIRGIN STAND OF HEMLOCK THAT HAS BEEN PROPERLY THINNED OUT, LEAVING THE TALL STRAIGHT TREES FOR INCREASED GROWTH. NOTE THE MANNER IN WHICH THE TREES HAVE NATURALLY PRUNED OFF THE LOWER LIMBS.

of extensive forest parks—remnants of the original virgin stand of primeval forest for both aesthetic and commercial purposes.

Municipal forests are common in Europe. They are common and popular because long ago it was found that by developing waste lands or those of little value in the vicinity of the cities for growing timber, good profits could be made in forest rotations of from thirty to sixty years. In this way material assistance was given in meeting the city budgets, and, consequently, in decreasing the property tax rate. In a few instances municipal forests under skillful silvicultural management have yielded a return sufficient to meet all the expense of the city and in addition have provided a sinking fund for future emergency, or, in some cases, a dividend to the stockholders of the city, who, in other words, are the property owners.

Besides the commercial aspect of these city forests, they have contributed immeasurably to the health and pleasure of the people by furnishing an enjoyable

breathing spot and place for recreation. In addition, European cities are sometimes wholly dependent upon their municipal forests for their fuel and lumber supply. Thus in many ways they enter into the municipal and domestic economy.

It is only a question of time before American cities will realize the desirability of acquiring waste forest lands within or near their limits, that are unfitted for agricultural development or undesirable for building or other more valuable purposes with the view of placing them under scientific forest management. Several municipalities and private water companies have recognized the advisability of developing their forest lands on the drainage basins of reservoirs both as a source of revenue from the yield of wood products and to maintain the best sanitary conditions. Municipalities and corporations permanent in their nature are better fitted to practice forestry because they can borrow money at such low

rates of interest. Forestry is not a business of quick returns.

Consistent with its progressive attitude on many municipal problems, the city of Syracuse has recently taken up the practice of forestry on a tract of timber land on the watershed of Skaneateles Lake, the source of the city's water supply. The forest was purchased primarily to avoid the possibility of contamination. With this object accomplished, it has sought to develop the timber along commercial lines, while still maintaining a continuous forest cover to protect the watershed. A good forest growth is conducive to clear pure water, whereas a denuded or barren watershed is often responsible for floods and the washing down of silt with a consequent muddy water supply. With this in view, the city has placed the management of the tract in the hands of the New York State College of Forestry at Syracuse University, to serve not only as a demonstration of the possibilities of practical forestry, but also as a business proposition for the city.

The tract consists of approximately 150 acres along the shores of Skaneateles Lake, one of the chain of the so-called "finger lakes," including Cayuga, Seneca, etc., in Central New York. The timber is middle-aged, second growth, mixed hardwoods of practically every known species of the region, with some hemlock. The principal trees represented in order are the basswood, hemlock, chestnut, oak, hard maple, and some scattering beech, hickory, ash, yellow birch, cherry, elm and yellow poplar. Many of the trees are still in the young "pole" stage of development. An estimate of the tract shows that there are approximately 6,000 feet, board measure, per acre. In terms of cordwood there are about 35 cords per acre. This is an excellent yield of timber considering the age and the past neglected condition of the tract.

The object in forest management will be to favor the chestnut, provided it continues to be free from the blight attack, which has spread with such disastrous effects over Long Island, Connecticut, and eastern Pennsylvania.



A VIRGIN STAND OF HEMLOCK, BEECH AND BIRCH. FIRES HAVE BEEN KEPT OUT AND EXCELLENT FOREST CONDITIONS ARE ESTABLISHED. SEVERAL OF THESE TREES HAVE NEARLY REACHED MATURITY AND SHOULD SOON BE CUT.

Oak, basswood and cherry will also be favored. These are the most valuable and rapidly growing species, and all will find a ready market in the near vicinity. There is an especially good market in the neighboring cities for poles, posts, ties, cordwood, and box-boards. The soil and site conditions, moreover, are very favorable for forest growth. The species that will be discriminated against are the hemlock, soft maple, aspen, beech, and ironwood, owing to their slow rate of growth, difficulty of silvicultural treatment and relatively inferior quality of wood produced.

In putting the tract under scientific forest management the first operation was to make a topographic map of the area to ascertain the boundaries and the configuration of the land. Along with this, an estimate was made to determine the character of the forest and to take stock of the amount of cordwood and lumber that is now standing on the tract.

For the purposes of fire protection, trails three feet wide were cut down to mineral soil on the boundaries, where no protection such as the lake and roads were afforded, to prevent destructive surface fires either from coming over from adjacent timber land or from spreading from the city forest. An improvement cutting was next made to clean out all the dead, diseased and insect-infested trees and to discriminate against the inferior in favor of the more desirable species. In this operation, an excellent opportunity was given to display the fine points of the forester's knowledge of the proper handling and improvement of woodlands. In connection with this work four permanent experimental plots were laid out for the purpose of studying the rate of growth of the different species and the effects of different methods of silvicultural treatment.

Based upon evidences of a rapid rate of growth as a result of unusually favorable soil conditions, the growth is estimated to be at least one cord of wood per acre per annum. With careful treatment this rate of increment laid on each year should be materially increased. Thinnings made about every

tenth year should easily pay for themselves. It is planned, also, to plant up some open waste areas and part of the tract where the forest cover is not sufficiently dense with white pine, Norway pine and Scotch pine. The city forest is especially well favored in its location and soil conditions for successful forest plantations, and there is every evidence that these species can be brought to merchantable size in from thirty to fifty years, depending upon the kind of product that is desired on the markets. The portion of the tract to be planted consists largely of stony old pastures and fields once covered with apple orchards. Already young seedlings of oak, ash, elm and poplar are appearing in them. It will be more desirable and profitable, however, to plant these areas to white, Scotch or Norway pines on account of their rapid growth and high technical quality of the wood product, particularly with the white and Norway pines. For permanent forest management, it will undoubtedly be more profitable, in the long run, to introduce these rapidly growing conifers rather than to continue with pure hardwoods. Generally speaking, hardwoods are comparatively slow in growth and do not grow so densely in the forest. This consequently means a greater yield with the conifers in a shorter length of time.

In Europe the most splendid example of successful forestry is found in the Sihlwald, the city forest of Zurich, in northeastern Switzerland. This has yielded an annual income per acre of \$7.57. Many municipal forests in Germany have yielded a net income of over \$5.00 per acre annually, after all expenses of administration and protection have been deducted. In comparison with agricultural yields, these figures are not proportionately high. However, when we consider that these forests are occupying soils wholly unsuited and unfit for tillage or more valuable purposes, it is an excellent return on the capital invested. In addition, these forests are serving a real purpose in putting otherwise waste lands to profitable use, in equalizing the stream flow to prevent floods and in providing a cheap and abundant fuel and lumber supply.

THE FIRST ANNUAL REPORT OF THE STATE FORESTER OF MINNESOTA

By PROF. E. G. CHEYNEY

Director of the Forest School, University of Minnesota

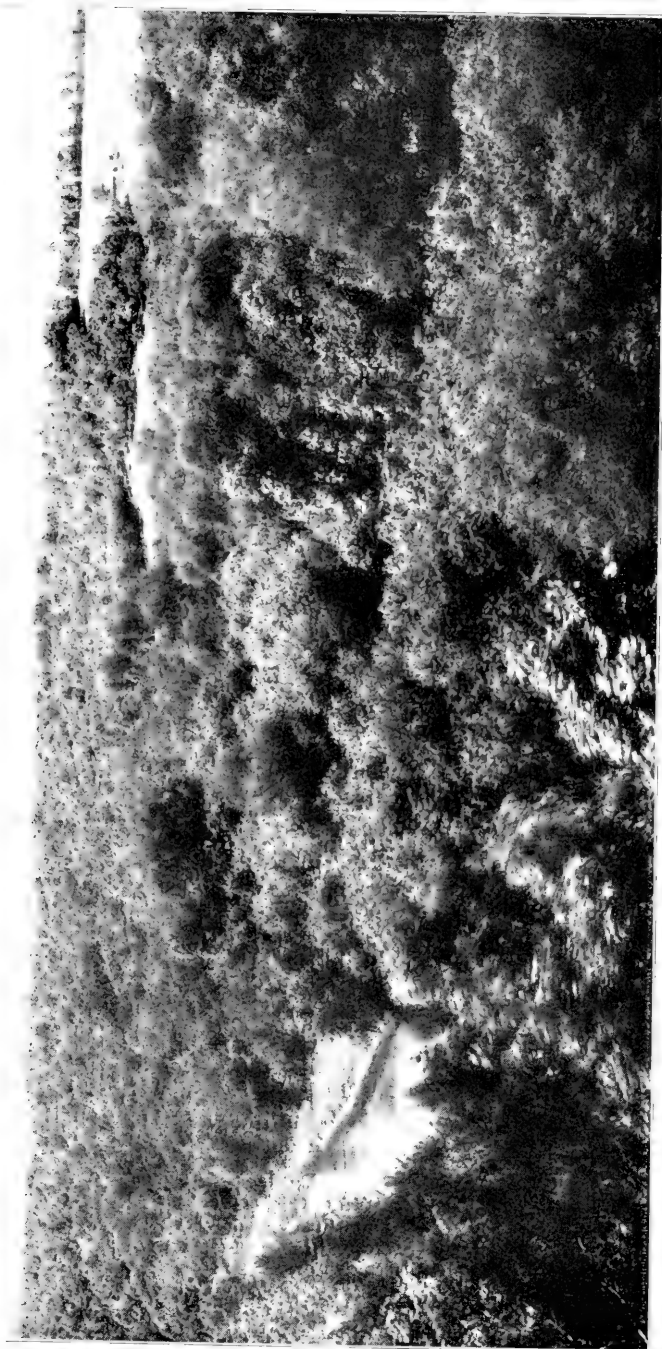
WE always look forward with interest to the first report of any new undertaking to see what it promises for the future. This is especially true in the case of the establishment of a new department in the State Service. Will it simply assume the titles given it by law and proceed to spend the appropriation allotted to it in the easiest and least disturbing way? Will it become a part of the political machine,—a roosting place for lame ducks—using its appointive power to secure the votes of otherwise useless employees? Or will it really be an efficient organization, grasping the problems presented to it with a broad comprehension of its possibilities, striving for the welfare of the State and seeking to get value received for every penny expended?

That is the most important question and it is answered in the first annual report of the State Forester of Minnesota in no uncertain tone. The whole report rings true to the note of efficiency and service. All the men in the new service are technically trained men or experienced woodsmen holding their positions through efficiency.

A mere glance at the nature of the contents of the report shows the broad conception which the forester has of his duties; fire prevention and fire fighting in all its phases, including the education of its citizens, the disposal of slash, the protection of frontier towns, the building of watch towers, the improvement of trails and portages, the construction of telephone lines, the surveying and mapping of tracts of absolute forest



CLEARING RIGHT OF WAY FOR RAILROAD THROUGH DENSE TIMBER. SLASH BURNED CLEAN UNDER DIRECTION OF RANGER—PULP WOOD WILL BE HAULED OFF.



HARDWOOD FOREST ALONG THE ZUMBRO RIVER, SOUTHERN MINNESOTA.



PRIMEVAL WHITE PINE ON ROCKY NON-AGRICULTURAL SOIL, SHOWING WHAT MAY BE DONE WITH MILLIONS OF ACRES OF SUCH LAND



THIS WAS A WAGON ROAD BEFORE THE FIRE WENT THROUGH.

land, a study of the extent and distribution of the State's forests, the forest's share in the wealth and welfare of the State, the education of the people at large in the value and benefits of permanent forests.

That outlines a far-reaching and comprehensive program. Whether it can be carried to completion in all its branches in the future depends largely on the people of the State, but it shows that the forester has a true conception of his enormous responsibilities.

But let us vent our criticisms first and be through with it. The worst, practically the really bad, feature of the report is the lack of an index. The reference value of the book is greatly crippled by the lack of this simple contrivance, and its omission seems inexcusable.

Naturally the bulk of the report deals with the fire problem—the first that the forester must meet in any field. The organization consists of the State Forester with the Assistant State Forester working through a force of fifteen permanent District Rangers, who in turn have under them a force of temporary patrolmen. The first object is fire prevention; the second to extinguish existing fires as quickly as possi-

ble. Every effort is directed first toward prevention.

To those familiar with the former attitude of all those interested in forest fires in Minnesota the most remarkable feature of the whole report is the truly wonderful degree to which all these diverse interests have been induced to co-operate with the new Forest Service in the protection of the forests.

The United States Forest Service under the Weeks Law gave \$10,000 for the employment of patrolmen to work under the district rangers on the watersheds of the navigable streams.

The railroad kept reserves to act as patrolmen along their rights of way at the call of the rangers in the danger season, and extended many courtesies to aid the new service.

Some of the timber owners hired patrolmen of their own to work under the rangers.

A large number of organized towns taxed themselves to add their patrolmen to the State force.

The number of patrolmen, and hence the working efficiency of the service, was *more than doubled through co-operation*.

One of the most interesting features brought out, especially interesting be-



SLASHINGS PROPERLY PILED FOR BURNING.

cause it is a new idea, is the protection of the towns in the forest areas by the construction of firebreaks around them. Such breaks were built only at the instigation and with the co-operation of the State Forest Service. Such a break would have saved any one of the numerous towns which have been wiped out by forest fires in the past

years. The method and cost of construction makes interesting reading.

But even more interesting is the description of the great firebreak in the great burnt-over district devastated by the tremendous fires which destroyed the towns of Baudette and Spooner two years ago. This work, made possible by a contribution from the Red Cross



PEAT BOG FIRES BURN WINTER AS WELL AS SUMMER THEY MUST BE DUG OUT.



MINNESOTA FOREST SERVICE STEEL TOWER AT GULL LAKE, ERECTED AUGUST 25, 1911. COST \$36.30.

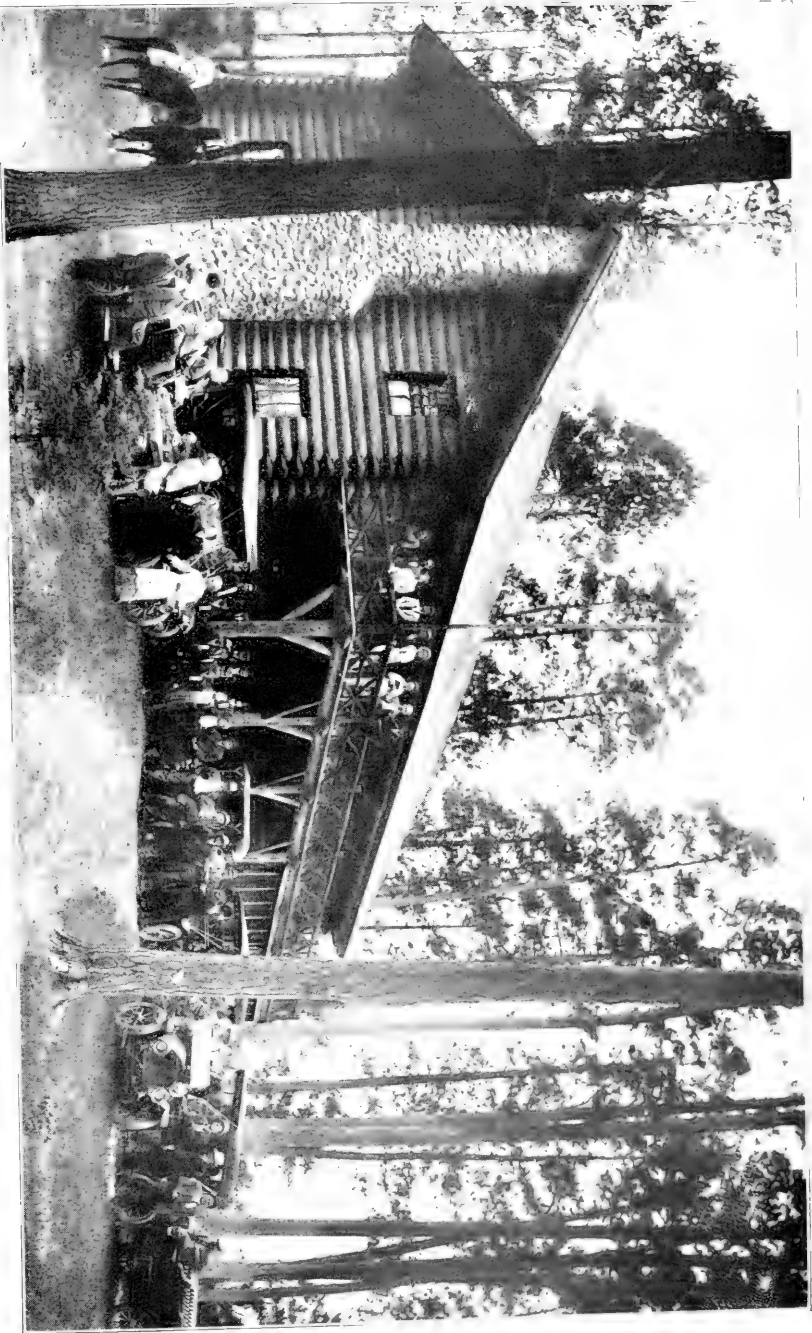
fund for the aid of the fire sufferers in that district, is the most comprehensive system of firebreaks in the country that have ever been constructed for the protection of such an extensive area. Would not such systems of breaks pay in every forested area?

Quite as interesting, and probably the most valuable, data in this report is the detailed description and accurate cost data on the extinction of an extensive bog fire in southeast Polk County, covering an area of 236 acres, by means of a power ditcher and constant control, at a cost of \$1,800. It shows how serious these fires can really be. The moral drawn is that they are very cheaply handled when small and very expensive when allowed to grow. They are usually totally neglected.

Although this work of fire prevention and fire fighting naturally occu-

pies most of the State Forester's time at present and a large proportion of his report, he makes it distinctly understood that he considers it only as the preliminary step which will make his proper work, the scientific management of the State's forests, possible.

Among the interesting facts contained in the report is the statement of Minnesota's forest resources. In spite of the ravages of legitimate lumbering and inexcusable fire loss, she still has the greatest forests of any State east of the Rocky Mountains. They are spread over 28,000,000 acres and contain approximately 75,000,000,000 feet of merchantable timber, with a value to the people of the State equivalent to \$975,000,000. Quite a considerable portion of this is made up of hard woods located in the southern portion of the State.



STATE EDITORIAL ASSOCIATION PAYS VISIT TO DOUGLAS LODGE IN ITASCA PARK.
Minnesota Forest Service Photo.



WHERE TRAILS GIVE OUT FOREST OFFICERS MUST BUILD RAFTS TO CROSS THE NAMELESS LAKES, NORTHERN COOK COUNTY.

This report as a whole is a very good record of the year's work of the State Forest Service—a virile record of the achievement of things worth while—and contains most valuable information. Its honest striving for the welfare of the State and its pointed calls for the needs of the future should enlist the sympathy and support of every true patriot. It is a true, manly appeal which every one should heed. If the forester can attain the goal he sets up for himself in this first report, the conservation of Minnesota's forest wealth is assured.

There are a number of good photographs illustrating the text very well.

It is to be regretted that more space in the report cannot be given to the "State Forests." That, however, is

not the fault of the report, but due to the lack of "forests." Out of more than two million acres of forested land actually owned by the State, only three pitifully small tracts are under the control of the forester. Millions of acres are wasting away in idleness, either in the possession of the State itself or of private parties. Moreover, large areas of non-agricultural lands are constantly reverting to the State for non-payment of taxes, to be bought up by the speculator, who alone profits in the subsequent sales and re-sales to unsuspecting purchasers. These lands should be producing valuable timber crops. It is to be hoped that the great State of Minnesota will soon turn over some of them to the State Forester, so that they can be cared for in a businesslike man-



MOOSE EATING LILY ROOTS FROM BED OF LAKE NEAR ELY, IN NORTH-EASTERN MINNESOTA.

ner, thus adding, with their productiveness, to the wealth of the State.

Among the most interesting paragraphs of the report are the following:

MUNICIPAL FORESTS WOULD PAY.

The value of a woodlot or convenient grove to a farm is not fully realized by a man accustomed to living in timbered country until he has lived on the prairie. There he is dependent upon distant coal mines for his fuel, and as shown by recent railroad tie-ups and car shortages, he is by no means assured of enough coal. Every farm and every town, with a woodlot of sufficient extent, is assured of independence from one form of monopoly.

That prairie dwellers realize the value of a woodlot, as a wind break, and as a fuel supply, is made evident by the fact, that the farmers of the prairie region have planted groves which amount in the aggregate to several hundred thousand acres. This fact should give pause to any farmer, who is rapidly reducing his woodlot, without thought to the future. Although a bounty has been offered as an inducement to plant trees on the prairie, it has amounted to very little to the individual. Even when the labor of plant-

ing is done, he must wait a number of years for his timber to grow to usable size. In the meantime he is dependent upon outside sources for his fuel, and his buildings are exposed to the force of the wind. In how much better circumstances is the man whose farm is situated in the timber, and who has been thoughtful enough to retain a good-sized woodlot? Such a man, if he has kept enough timber, is independent of any rise in fuel prices, and by careful use, this independence may be made permanent.

FOREST INFLUENCE ON FARMERS.

Aside from taxes, the economic importance of this "raw-material," or industrial, side of the forests is more far-reaching in Minnesota than is ordinarily understood. They are *not* of value *only* to the parts of the State where merchantable timber is found. They are of great importance to the farming regions; thus: The great timber industries in woods and town and city require large numbers of draft horses; in fact, are principal buyers in the horse markets. Horses are becoming one of the great sources of profit to Minnesota farmers, more and more attention being devoted to that

branch every year. As the forest industries decrease in extent every year, the market for horses decreases and new markets have to be sought out. With the rapid increase in the cities and elsewhere of the use of automobiles where formerly horses were used, the markets for horses are becoming restricted. The farmer, therefore, should do all in his power to perpetuate that lumbering industry, in the logging end of which, at least, horses cannot be displaced by autos. Horses require feed—oats, corn, bran, hay. Immense quantities of these farm products are purchased every year to feed the logging teams of Minnesota. Furthermore, the camps in the woods, of which there are 1,500 in Minnesota this year, require immense quantities of beans, beef, pork, potatoes, cabbage, onions, and almost every variety of farm products, to feed the great army of woodworkers. Therefore, a decrease in the logging industry directly affects the farmers of Minnesota to a really large extent. The latter, therefore, should wish to see this industry prolonged, and perpetuated, wherever forest can grow most profitably, and they should co-operate in this work of fire prevention.

HOW RECEDING FORESTS HAVE AFFECTED MOISTURE IN THE GROUND.

Formerly timber on the hillsides and bottom lands protected the heavy snow from too rapid melting, permitting the water therefrom to soak into the soil, and so gradually to reach the river. Raging spring floods were then not so common; power projects could depend upon an equable amount of water all summer, until the fall rains renewed the ground supply, and reservoirs were not filled up with mud. Now, however, the snow in the spring, unprotected by forests on these particular watersheds, goes so rapidly that only a very small part of it, with the rains, has time to soak into the ground. Most of the melting snow and the rain water therefore runs off swiftly over the surface, all of it being poured into a stream practically at once. This causes a torrent. Immediately when the snow is gone, the flood subsides through lack

of supply and the stream shrinks to normal stage. The latter is maintained for a time by seepage from what little moisture the ground has retained. This exhausted, the stream becomes a creek, and log drives are "hung up," causing the shutting down of sawmills and lack of employment for many men. Flour mills, run by water power, must keep their head-gates closed days at a time, in order that they may get "head" enough to run for one day. Normal rainfall does not reach the streams, being absorbed and retained by the dry earth. With heavy rains or cloudbursts, the surface runoff not being retarded by forest cover, great floods again occur, with like ensuing conditions, often leaving a trail of death and devastation behind them. The flood of Johnstown, Pa., and more recently that of Austin, Pa., and Black River Falls, Wis., are cases in point. These and similar calamities have repeatedly occurred in the United States and in this State, where no active consideration has been given to retaining forests to regulate water run-off.

WHY EVERYONE SHOULD CO-OPERATE IN PRESERVING THE FORESTS.

The forests of Minnesota are of direct value to every citizen; their loss would be in equal proportion a direct loss to every citizen. Consistently, therefore, there is no person in Minnesota who should not be eager to co-operate with the service in its initial undertaking toward perpetuating those forests, namely, in protecting them from ruin by fire. Nor should the people stop there. They should further co-operate with the service in retaining, upbuilding and scientifically developing the forests so that they may be a permanent source of income to the people. They should co-operate thus because of the great and undeniable economic value of the forests to the people as a whole. True, this may be said of almost any great industry, such as farming. But farming is on the increase. Scientific methods of farming have been and are being rapidly evolved and generally adopted. So widespread is the interest in this upward movement, so much private and public money

is being devoted to it, that farming is on a firmer footing in this country than ever before. The same may be said of other industries. The reverse has been true of the forests. This should not be so. There is as great need for practicing scientific forestry as there is for practicing scientific farming on the agricultural lands.

For years, the forests of Minnesota, so long regarded as an inexhaustible resource, have been diminishing in extent. This has been going on with no attempt until recent years to check it; has been going on for years in face of the fact that the *true* economic value of the forests is second only in importance to that of the farms. The downward movement is to be observed not only in the decrease in annual income directly from the forests, but in its harmful effect upon so many industries which touch upon them. Fur-

thermore, it is apparent in the increased cost of forest products to the consumer. The time is at hand when that downward movement must be stopped, or the gradual loss will soon become a permanent state calamity. To this end, therefore, not only should the lumber companies, railroads, settlers and others, observe the laws for forest preservation, and give organized assistance in that work, but *every one* should, for his own benefit, co-operate to the utmost extent that he may in the work of preserving and perpetuating the forests. Without the combined individual and organized aid of every one, the work of the service for the forest welfare must, proportionately as that aid is lacking, be hindered and lack in efficiency. Only with that aid can the forests be brought to the point where they will be productive of the *greatest* benefit to the people.



VIEW FROM ONE OF THE MOUNTAIN LAKES OF COOK COUNTY, MINN.

BREEDING FUR-BEARING ANIMALS

The Fur News Publishing Company of 71 West 23rd St., New York, has issued a very interesting book entitled "Fur Farming for Profit." It is designed as a practical text book on breeding fur-bearing animals either as a distinct industry, or in connection with specialized or general farming and treats of the subject in twenty-nine well-written chapters which are profusely illustrated.

A NEW BOOK BY DR. C. A. SCHENCK

The third and revised edition of "The Art of the Second Growth or American Silviculture" by C. A. Schenck, Ph. D., director of the Biltmore Forest School, is just out. It was originally published in 1905, and is now in its present form enlarged and brought up to date. It will be found an excellent text book for students and will be also of much value to lumbermen and foresters.

EMPIRE STATE ASSOCIATION MEETING

NO more successful meeting has ever been held by the Empire State Forest Products Association than the one at Watertown, N. Y., on November 14, which was attended by about a hundred men interested in forest conservation and water power preservation. They heard many excellent addresses, were delightfully entertained and derived much benefit from the meeting, which resulted in decisions for closer co-operation between the Association, the American Forestry Association, the Camp Fire Club of America and the Society for the Preservation of the Adirondacks. The tenor of the addresses showed that there was keen realization of the fact that these organizations, working together, could accomplish much that is desired in forest and water conservation in New York State.

President Frank L. Moore in his opening address said:

"There has been in the past too much theory and too little practical knowledge of the vast forest areas that are the property of the people. This property, which has been purchased by levying laws, of which you and I have paid our proportion is of inestimable value, but under the constitution of the state we are prevented from deriving any revenue from a matured and decaying crop. That same constitution says that we must not use any of the people's property to create storage reservoirs for the benefit of the people of the State. I say this advisedly because wherever power can be created, manufacturing industries spring up, population of towns increases, and the ever alert assessor places your property on the assessment roll of the State and then taxes from which death alone can separate you. If you and I managed our business this way we would be classed unsuccessful.

"It is evident that the people, the real owners of the vast estate, had rather pay a direct tax and allow a maturing



FRANK L. MOORE, OF WATERTOWN, N. Y., RE-ELECTED FOR THE THIRD TERM AS PRESIDENT OF THE EMPIRE STATE FOREST PRODUCTS ASSOCIATION.

and ripe crop to rot, than to say that we will amend the constitution, pick out someone to manage this property and put it upon a revenue-producing and self-sustaining basis. When this is done, a direct tax will be unheard of.

"Another phase of our forest management that is causing serious thought by those directly responsible is: shall we continue to make annual appropriations for further purposes under our present constitution, or shall a way be found where this money may be expended for the perpetuation of our forests and at the same time produce a

revenue to the State? I do not believe in investments that will not produce some return. The people of the State should arise en masse and demand an income from their investment which should be applied to lessen their taxes. Until our constitution can be amended we should ask the Legislature to pass a law permitting the people to acquire larger interests in forest lands. I believe a law could be drawn that would be constitutional and that would permit the State to reforest private lands under the following conditions:

"An individual or corporation to make application to the conservation department to reforest certain lands, the growing crop to be free from taxation. The trees, when matured, to be cut under State supervision and a stumpage paid to the State, the stumpage to be a lien against growing crop. The amount of stumpage to be agreed upon by the owners and the commission in charge, the trees to be considered matured when they reach a diameter of 12 inches.

"I believe a law framed as the above would promote continuous reforestation along our rivers and streams.

"I believe also that the constitution should be so amended as to permit the cutting of matured trees upon State lands under control of the State department, and the proceeds of the sale of the stumpage be applied to further purchases or to help defray the expenses of government.

"The Bird amendment so-called was the result of initiative taken by your officers, and to-day we can point with pride to the loyal support it has from all associations interested in permanent growth.

"I believe in enlarging forest fire service. Reforestation will accomplish but little with inadequate fire protection."

Prof. Nelson C. Brown, of the New York State College of Forestry at Syracuse, read an excellent paper on the development of forest utilization in this country and said he believed the practice of forestry in this country in the future would be devoted as much to complete utilization of the timber resources as to the growing of timber.

He advocated a more liberal policy in the management of the State-owned timber land.

An address on the work of the American Forestry Association, and the important investigative work to be undertaken next year in co-operation with the lumbermen and timberland owners, State foresters and fire protective associations, was given by P. S. Ridsdale, the executive secretary; A. S. Houghton, of the Camp Fire Club of America, spoke on the growth of forest conservation in New York State and the increasing interest of the lumbermen in the work. Dr. Edward H. Hall, of New York City, the secretary of the Society for the Protection of the Adirondacks, urged, in a witty and impressive talk, an open discussion of any differences of opinion between his association and other organization regarding differences in policy in efforts to preserve the Adirondacks.

W. L. Sykes, of Buffalo, who had driven forty miles through the rain and over muddy roads in an automobile from Cranberry Lake to get to the meeting, made an interesting report for the forestry committee, of which he is chairman, and this was followed by a general discussion of conditions in the forests. Mr. Sykes urged that the State adopt a more liberal policy in permitting private owners to build roads across State lands in order to market their timber.

Prof. Samuel N. Spring, of the forestry department of Cornell, who is a member of the State board, which is investigating the question of forest taxation, lucidly described different methods of taxation reforms which have been proposed and in which those present were greatly interested. This talk, too, was followed by a general discussion, during which Prof. Spring answered a number of questions about various features of forest taxation laws.

At the banquet in the evening there were addresses by M. H. Hoover, of the State Conservation Commission; State Senator T. Harvey Ferris, of Utica; James L. Hutchins, of Rochester, and an illustrated talk on State forestry by Dean Hugh P. Baker, of

the New York State College of Forestry.

The resolutions adopted at the meeting denounced the Canadian reciprocity treaty, approved the Jones bill relating to the taxation of forest lands, and went on record as favoring the placing of fire wardens under the civil service laws.

The first of the resolutions follows:

Resolved, That the Empire State Forest Products Association reaffirms its desire to confer with the Camp Fire Association, the Association for the Protection of the Adirondacks, the New York Board of Trade and Transportation and any other association or individuals for the purpose of harmonizing the several interests in the Adirondacks; and we hereby pledge our co-operation in support of any reasonable improvement in establishing rational scientific forest management, with due consideration to vested rights, to the end that the forests in the State of New York may be operated and maintained for the greatest good to the greatest number.

The association, by resolution, commends the Burd-Merritt amendment for an adequate system of water storage in the Adirondacks to regulate the flow of streams.

The following resolution was adopted on the State College of Forestry:

Resolved, That we commend the efficient educational work of the New York State College of Forestry in training professional foresters and practical woodsmen in its Ranger School, and the study which the col-

lege is making of the wood-using industries of the State in co-operation with the national forest service, to the end that the proper use of our forest lands will be more generally and better known. It commends especially the State-wide work which the college is doing in taking forestry to the high schools, granges and other organizations as well as its work along experimental lines.

Frank L. Moore was re-elected president for a third term. F. J. Jones, of Buffalo, was chosen as vice-president, and H. J. Cadwell was re-elected secretary and treasurer. The following committees were named:

Board of Directors—Rufus Sisson, Potsdam, chairman; G. H. P. Gould, Lyon Falls; Charles F. Moore, New York; Ferris Meigs, New York; E. K. Harroun, Watertown; E. J. Jones, Buffalo; Maurice Hoops, Glens Falls.

Legislative—Ferris Meigs, New York; George Ostrander, Glens Falls; George C. Sherman, Watertown; Charles Moore, New York; E. J. Jones, Buffalo; V. K. Kelloff, Watertown; Charles Sisson, Potsdam, and J. G. Hoffman.

Transportation—John D. White, Utica, chairman; J. N. McDonald, Utica; Charles Griffin, New York; Fred Cleveland, Albany, and C. H. Tiffany, New York.

Forestry—W. L. Sykes, Buffalo, chairman; George A. McCoy, Tupper Lake; R. W. Higby, New York; F. P. Wilder, Watertown; Isaac Kenwell and Prof. Nelson C. Brown, Syracuse.

A REPORT ON FOREST FIRE LOSSES

Forest resources having a valuation of more than \$25,000,000 are lost annually through fire, according to Fred G. Plummer, geographer of the United States Forest Service. Besides this great loss of timber, there has been an average loss of seventy human lives a year in the forest fires of the last half century.

In a study which he has just completed, Mr. Plummer has drawn upon all the forest fire statistics known to exist, and has worked out for the government a system of standardized reports which will give to future generations data of the causes, extent and effects of forest fires which will be far more complete and accurate than the records which have been kept heretofore. Mr. Plummer makes a point of the fact that there are enormous forest fire losses from the destruction of young tree growth, deterioration of the soil, damage to watercourses, interruption of business and the depreciation of property which are important, but which cannot be estimated accurately.



A RANGER TRACING LINES IN WINTER UNDER DIFFICULTIES, MINNESOTA NATIONAL FOREST.

THE FOREST RANGER

A. G. JACKSON

Who is this forest ranger man we hear so much about?
What does he do, how live his life, where is his daily route?

The forest ranger is the man who guards the nation's wood,
Performs his Uncle Sam's odd jobs and does his duty good.

His life is lived away from town, and often quite alone
He rides the trail or climbs the ridge wherever trees are grown.

He gathers seed in autumn from the sturdy forest trees,
And scatters them where barrenness exists by fire's decrees.

The snow-clad peaks, the mountain lakes, the river's rushing brim
The cabin and the jungle dark alike are known to him.

By their first names he calls the trees and counts each one his friend.
He knows the furtive wood folk too, and how their lives they spend

He finds the way and builds the trail where few have been before;
And to a beauty spot long closed he leaves an open door.

In August's heat he makes his beat from lowlands to the higher,
And oftimes mid deep smoke and flames he battles forest fire.



A RANGER TRACING LINES IN WINTER UNDER DIFFICULTIES, MINNESOTA NATIONAL FOREST.

With compass, aneroid and book he makes the forest maps,
And carries quilt and frypan with his surveying traps.

Each day you'll find him on the job in charge of timber sales,
And every log or bolt that comes with diligence he scales.

And nursery rhymes he croons at night to baby firs and spruce
That soon will grow to take the place of old trees put to use.

The ranger's works are legion; he cooks, he packs, he rides,
He's carpenter and mason, he paints and drafts besides.

He's sometimes building cabins and installing telephones,
And sometimes cruising timber, and sometimes hauling stones.

For any work that's needed on his unc'les forest land,
The ranger's ever ready with a willing skilful hand.

On what he sees, and what he does, wherever he resorts,
He must embody all the facts in various reports.

The forest ranger sometimes wears a Service uniform;
More often khaki overalls keep his strong figure warm.

The ranger likes his T-bone steaks and strawberries and cream;
His frequent food is "mulligan" beside some mountain stream.

The forest ranger sometimes works but eight hours for a day,
And days when he puts in sixteen, they don't increase his pay.

The forest ranger on his trips as he goes down or up,
Oft takes along for company a well bred Airdale pup.

The forest ranger likes his job: he has no time to knock,
And when at length promotion comes it strikes him with a shock.

Thus the ranger's life is lived with nature wild and free,
His soul uncaged by city walls—His is the life for me.
Berlin, Wash., Oct. 27, 1911.



A RANGER PILING AND BURNING BRUSH IN THE WINTER.

THE FUTURE SUPPLY OF HICKORY

America must soon begin to plant hickory or this country will face a serious shortage in one of its most useful hard woods, according to Raphael Zon, expert in charge of the office of silvics in the United States Forest Service.

America is now supplying the hickory which is used over the entire world. A fact not known to the average person is that hickory is distinctively an American tree, growing only in the eastern part of the United States. It is usually scattered among other hard woods, and up until the present time sufficient quantities have been found to supply the demand at reasonable prices, but experts in the United States Forest Service now realize that the timber must be planted if the future supply is to be guaranteed.

CONSERVATION REALIZED IN MASSACHUSETTS

BY HARRIS A. REYNOLDS

Secretary, Massachusetts Forestry Association

MASSACHUSETTS is not blessed with coal or copper mines, nor oil and gas wells. Consequently, it has none of those natural resources to conserve. It has a problem, however—the preservation of its forests, and the reclamation of its waste lands. It may surprise those who are not familiar with Massachusetts to learn that as one of the States first settled, it is still nearly one-fifth wild or waste land. About 1,000,000 acres of the State are covered with scrub growth, or deserted farms where the soil is either too wet or too rocky to produce profitably without the application of scientific farming methods. On the other hand, this land is ideal for the growth of white pine, which thrives like a weed all over the State. It is evident that permitting this land to lie idle is a great economic waste to the State and community at large amounting to millions of dollars annually.

Conservation was practiced in this State, however, long before the Conservation Commission produced its voluminous report. In 1898, the Massachusetts Forestry Association was organized and incorporated. It is a private organization and consisted at that time of only a few far-sighted citizens who saw the need of preserving our shade trees and protecting our forests. Until the past year, its energy was directed mainly toward procuring forest legislation. The Tree Warden Law was passed in 1899, requiring every town to select a citizen whose duty it is to protect the trees and see that the shade tree laws are obeyed. To create the office of State Forester was more difficult. It took several years to convince the Legislature that such a State Department was needed. This was done only after the Association had employed a forester and gave his services gratis to the people of the

State for one year. The following year the office of State Forester was created and the State Forestry Department organized. This department last year spent \$355,000, including the Gypsy Moth Funds, which were \$315,000. In bringing the Weeks Bill into life as an Act of Congress, this association took a leading part. The purpose of this act is to create national forests on the headwaters of navigable streams, especially in the White and the Southern Appalachian Mountains, the forests to be so located as to protect the watersheds against erosion and to regulate the flow of the streams.

Last year, largely through the instrumentality of this association, the State Forest Fire Warden Act was passed, creating the office of State Forest Fire Warden under the direction of the State Forester. Mr. M. C. Hutchins, formerly of the New York State Fire Service, took charge of this work, and for the past year he has been perfecting our fire protection system. Lookout stations have been established on the high points in the State, from which men who are stationed there during the dry seasons can observe every part of the State. These men are connected by telephone with the fire wardens in the respective towns surrounding them, and immediate alarm is given at the first sign of smoke. The damage done by forest fires this year has been only about one-twentieth of that of the previous year, before the system was installed, and the system itself is not yet perfected. This assures owners of woodlands that their timber will be protected, and reforestation is beginning in earnest.

The present tax system in this State is not favorable to woodland owners and this year a resolution to amend the State constitution was passed whereby the Legislature is given the right to

revise the system of taxing wild and forest land.

Now that the fire hazard and taxation difficulties are coming under control, the great problem of afforesting the fifth of the State is being solved in this way by the association. Branches of the Association are being formed in the towns and cities of the State. These local organizations serve as village improvement societies, except that their energies are devoted almost exclusively to forestry and shade-tree work. The branches are independent locally, having their own by-laws, which conform with the by-laws of the main association. Their membership consists only of members of the Massachusetts Forestry Association. Their secretaries send copies of the minutes of all meetings of the branches and their executive committees to the main office, where records of all branches are kept. In this way, the main association is in direct touch with the work of the branches and by constant vigilance, they are kept from becoming delinquent. Local improvement is brought about in this way, and, consequently, the whole State is benefited. The organization as a whole, becomes a body of workers, and local public spirit prompts the members to help in this organized effort to improve our forest and shade-tree conditions.

Unlike the average village improvement society which starts from a local impetus, these branch associations are not permitted to die out after one or two important objects have been accomplished. When a branch is organized it is at once set to work. A committee is appointed to draw up by-laws for the guidance of the branch. Another committee is appointed to study the local problems and present resolutions at the next meeting as to what the branch shall work for in the future. A date for that meeting is usually set before the organization meeting adjourns. This starts the branch to work, and the resolutions adopted at the second meeting are recorded with the main association, which keeps bringing these resolutions up before the branch continually, and urging it to carry them out. In that way, a branch is never totally idle, and

the very fact that it has something to do will keep it alive and self-respecting. A retired or moribund organization of this sort is worse than a dead one.

This work is being pushed as rapidly as funds will permit. The State has been divided into five districts and an assistant secretary is placed in each district, whose duty it is to do the preliminary work of organizing these branches by arousing local interest and by giving advice in forestry matters. We aim to keep these positions filled with trained foresters who do much good by advising individuals concerning their forests and shade-trees. These men are in line for positions as city foresters, which positions we are creating through the means of these branch associations. In turn, the city foresters are educating the people to the advantages of afforesting the watersheds from which the drinking water of the town or city is obtained. In a few instances this work has led to the consideration of having town forests, something on the order of the German Municipal Forests. This is the point we were coming to. Just as soon as the benefits of having such a forest is recognized, our wild and waste land will soon be put under cultivation. Our people are fast awakening to this fact through the educational influence of the Branch Association work and we feel safe in predicting that within a very few years most of these million acres of wild and waste land will be planted to trees. When each town plants a few acres yearly, and scores of individuals take up the work as they have already begun to do, in addition to what the State Department reforests annually, we shall soon change the face of Massachusetts.

Already these Branch Associations have done excellent work for their own communities. The Fitchburg Branch alone was the means of procuring over \$1,200 extra appropriations this year for forest, shade-trees, and park and playground work. Some have brought suit against offenders of the shade-tree laws. Plans have been laid by all for important future work and on the whole, the start made by these Branch Associations has been very satisfactory.

The idea is spreading rapidly and hundreds of people are becoming members of the Association in order to forward the good movement now under way. The membership of the Association has been more than doubled this year by

this means and people who have never heard of the organization are now among its enthusiastic workers. We believe that we are on the right track, and our theories of conservation are fast becoming realities.

WESTERN FORESTRY AND CONSERVATION ASSOCIATION MEETING

AN excellent program has been arranged for the annual forest fire conference of the Western Forestry and Conservation Association at Seattle, Wash., on Dec. 2 and 3, which will be attended, as delegates of the American Forestry Association, by director E. A. Sterling and executive secretary P. S. Ridsdale.

Besides members of the forest protective organizations of the Pacific Coast there will also be present representatives of the State, Federal and British Columbia Forest Agencies.

Following the opening address by President A. L. Flewelling and the report of Secretary-Treasurer G. M. Cornwall, Forester E. T. Allen will report on the work of the Association in regard to fire effort and losses, and there will be short reviews of 1912 experiences of private owners, by W. E. Wells, vice president of the Northern Montana Forestry Association; A. W. Laird, president Northern Idaho Forestry Association; Geo. S. Long, president Washington Forest Fire Association; Charles S. Briggs, vice president of the Oregon Fire Association; and R. D. Swales, manager of the Redwood Fire and Protective Associations. These will be followed by reviews of State and Government experiences by United States District foresters F. A. Silcox, for Montana and Idaho; Coert DuBois for California; state foresters C. W. Jungberg, for Mantana; J. R. Welty,

for Washington; F. A. Elliott, for Oregon, and Chief Forester H. R. McMillan, for British Cumbia.

In the afternoon there will be discussions on safeguarding logging operations by J. J. Donovan and Douglas Rodman; on slash disposal, by F. A. Elliott and J. L. Bridge; on railroad co-operation, by M. J. Buckley, of the O. W. R. R. & N. Co., and T. J. Humbird, president of the Clearwater Fire Protective Association. A banquet by the Seattle Lumbermen will be given in the evening.

On Tuesday there will be addresses on trail and telephone building, by W. E. Herring, Engineer of the U. S. Forest Service and Carl Bush, of the Western Electric Co.; on possibilities of wireless in fire work, by R. H. Sawler, of the Marconi Co.; on men, tools and supplies in fire fighting, by Coert DuBois and F. J. Davies; on fire fighting and patrol, by D. P. Simons, of the California Forest Protective Association, and R. E. Benedict, of the British Columbia Forest Service; on forest legislation, by C. S. Chapman, of the Oregon Forest Fire Association, and E. G. Ames, of the Washington Forest Fire Association, and on publicity work, by F. C. Knapp, president of the Portland Chamber of Commerce.

These will be followed by addresses by Geo. S. Long and Prof. C. H. Shattuck, the latter of the University of Idaho.

MR. OLMSTED WITHDRAWS FROM FIRM

Fisher, Bryant & Olmsted, consulting foresters, of 141 Milk Street, Boston, Mass., announce that Mr. Frederick Erskine Olmsted has withdrawn from the firm and the business has been incorporated and will be continued under the corporate name of Fisher & Bryant, Inc.

Mr. Olmsted leaves to practice consulting forestry independently and along special lines, but will maintain close relations with the new corporation. His address will be 21 Line Street, Boston, Mass.

NATIONAL FOREST RESERVE IN WEST VIRGINIA

BY J. A. VIGUESNEY,
Forest, Game and Fish Warden.

ON account of the peculiar location of the State of West Virginia, perhaps no State in the Union needs a larger forest reserve, but no action has yet been taken by the State to purchase or control any forest lands, neither has any law been passed controlling the cutting of timber so that our cut-over lands may again be reforested.

This is a deplorable condition, but nevertheless true, and the effects may be seen by traveling over many railroads of the State and looking at the cut-over areas, that are almost depleted of vegetation and practically useless for all time to come.

However, the National Government, having made a careful study of these conditions and realizing, especially, the great danger that we are facing on account of the drying up of the fountain heads of our great commercial streams, sometime ago, under the Weeks Law, made an appropriation for the purpose of making investigations looking to the purchase of large areas of wooded lands in several States.

Among the States that have properly qualified or passed laws, allowing the United States Government to purchase land for the purpose mentioned, are Maine, New Hampshire, Maryland, Virginia, West Virginia, North Carolina, Tennessee, South Carolina and Georgia, and naming the counties in West Virginia in which this land will be purchased as parts of Pendleton, Hardy, Randolph and Pocahontas.

For many years the United States Congress has been endeavoring to have a law enacted and appropriations made for the purpose of purchasing sufficient forest reserves to insure an even supply of water to our navigable rivers, were only successful in having such bill become a law until a recent session of Congress.

Anticipating the passage of such a law by the United States Government, the West Virginia Legislature of 1909, in conformity with the suggestions of Governor Dawson, in his biennial message, passed a bill which gives the United States Government the right to acquire such property. This bill comprises Chapter 61 of the Acts of 1909, and is as follows:

"An act to empower the United States of America to acquire lands in West Virginia, by condemnation or otherwise, for a national forest reserve, and granting to the United States all rights necessary for the proper control and regulation of such reserve.

Section 1. That the consent of the Legislature of West Virginia be and is hereby given to the acquisition by the United States, by purchase or by condemnation with adequate compensation of such lands in West Virginia as in the opinion of the Federal Government may be needed for the establishment of such a national forest reserve in that region; provided, that the State of West Virginia shall retain a concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases, and such criminal process as may issue under the authority of the State of West Virginia against any person charged with the commission of any crime without or within said jurisdiction may be executed thereon in like manner as if this act had not been passed.

Sec. 2. The power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition, as hereinbefore provided, for incorporation in said national forest reserve of such forest-covered lands in West Virginia as in the opinion of the Federal Government may be needed for this purpose.

Sec. 3. The power is hereby con-

ferred upon Congress to pass such laws and to make or provide for the making of such rules and regulations, of both civil and criminal nature, and provide punishment therefor, as in its judgment may be necessary for the management, protection and control of such lands as may be from time to time acquired by the United States under the provisions of this act."

The question of forests with their manifold benefits to the continued existence of mankind on earth, would fill volumes and cannot be properly discussed in an article of this character, but the benefits to be derived by our State and Nation by establishing a national forest reserve in the territory mentioned is so apparent that it deserves at least some passing comment.

The basic idea of the Federal Government in acquiring these reserves is to regulate the flow of water in the streams originating in these forest areas, which eventually form the navigable streams of our nation. But the control of such forests by the Federal Government would be of benefit in other matters, such as helping protect our forests from fire; maintaining an even flow of our streams, thus making them better for fish culture and furnishing better protection to our game and birds. While these lands will not be game preserves in a strict sense, yet with the protection from fire and under the patrol and care of the United States Government, it will, at least, make a refuge where game and birds can be protected from the pot hunter. The public will have the right to hunt and fish upon these lands, in accordance with the State laws, where they are located.

One has to but take a glance at the map of the portion of the United States which comprises this adventure, to be impressed with the wisdom of the government in acquiring same. Along these two great ranges of mountains the water sheds are formed that control the supply of water for all the Eastern part of the United States.

The position that West Virginia occupies in this undertaking is unique and more important than that of any other State affected, for the reason that two

of the greatest navigable streams in the United States take their rise in the Appalachian Mountain ranges, in the counties that are covered by this proposition.

While there are 282 navigable streams in the United States, it is shown by statistics that two West Virginia rivers, the Monongahela and Ohio, carry almost 25,000,000 tons of freight each year, or about one-fifth of the whole tonnage carried on navigable streams in the United States. For this reason, the protection of forests in West Virginia is of immense importance to the nation's inland commerce, for without this protection the time must come when these great navigable streams of commerce will fail on account of the drying up of the fountain heads of these streams.

The Government's aid in creating forest reserves in West Virginia will mean even more to us than maintaining a water supply for commercial purposes, and should not only be encouraged by State aid in every way possible, but corporations, firms and individuals should be reasonable in quoting prices on land which they have for sale in these designated regions. It is the purpose of the commission to obtain lands that can be purchased for a low or reasonable price, and not pay any fancy price for land for this purpose. There are thousands of acres of such lands in the mountain ranges mentioned that are scarcely valuable enough to justify the owners in paying taxes on same, which can be used to great advantage in this work and should be turned over to the Federal Government at a nominal price.

By establishing these forest reserves an even supply of water will be maintained for all time, and the great freshets and floods that have been increasing in the last few years will be held in check; the soil that is now held in place by these forest tracts will be retained and used in reforesting the cut-over areas, and the care that is taken of the tracts of the Federal Government will inspire others to take similar care of their forests, and in numerous ways the State will be benefited.

Thousands of acres of land in West

Virginia that have been cleared would be worth more in its primitive condition, and every available acre of forest land in the State, unless it is very valuable for agricultural purposes, should be retained as a forest reserve.

The United States forest service officials are doing a great work in educating the people to see the great good to be accomplished by protecting the forests. This is now regarded as one of the most helpful branches of the Department of Agriculture. This department undertakes the study and so-

lution of forestry problems, that cannot be handled by the States and individuals, and by sending out literature is creating an influence among all classes that will aid in protecting and conserving these great gifts of nature.

Many States have spent large sums of money to build up their forests that have been recklessly and needlessly destroyed. We have in West Virginia several millions of acres of forest lands, and if properly cared for, either by State or Government's aid, it will be of untold benefit to future generations.

DANGER TO THE NATIONAL FOREST POLICY

BY HENRY S. GRAVES

Chief Forester

HERE has been during the past two or three years a steadily growing movement to turn over the National Forests to the individual States. During the past session of Congress a rider to the Agricultural Appropriation Bill was offered in the Senate providing for the grant of the National Forests to the several States, together with all other public lands, including "all coal, mineral, timber, grazing, agricultural and other lands, and all water and power rights and claims, and all rights upon lands of any character whatsoever." While the amendment was ruled out on a point of order, it received a surprisingly large amount of support.

The proposition so far as the National Forests are concerned is to turn over to the individual States property owned by the Nation covering a net area of over 160 million acres. This property has an actual measurable value of at least two billion dollars, while from the standpoint of its indirect value to the public no estimate on a money basis could possibly be made. These are public resources which should be handled in the interests of the public. Moreover, the problems involved are such that they should definitely remain in the hands of the National rather than be turned over to the State Gov-

ernments. The property belongs to the Nation as a whole, and every citizen has an interest in it. The Government has already made enormous grants to the individual States, but always to further specific objects of National importance. There should not be a moment's consideration of the proposal to turn the Forests over to the States unless it can be clearly shown that the interests both of the States and of the Nation are consistent with such action. In the case of the National Forests, public interests both of the Nation and of the States require their continued retention and management by the National Government.

The scope of this article does not permit a full discussion of this problem. It must suffice to mention a few cogent reasons for Government ownership.

1. The property is now owned by the Nation, and should be administered from the standpoint of National as well as of local needs.

2. The problem of protection from fire and of timber production on the National Forests is one of National scope and can be properly handled only by the Government; its solution is a National duty.

3. The problem on water control is no less a National duty. Nearly all of the National Forests lie on head-

waters of navigable rivers or interstate streams. The Government is now purchasing lands in the East on headwaters of navigable rivers because of the disastrous results to the public which are following abuse under private ownership. It certainly should not part with title to the same class of lands which it now owns in the West. Every interstate stream presents problems which can be properly handled only through the Federal Government. The Government can not permit the citizens of one State to be damaged by the action or failure to act of citizens of another State. It is of vital importance for this reason alone that property at the headwaters of interstate streams be retained under Government administration.

4. Not only are the interests of the individual States and communities now fully protected, but in many ways far more is being done for local communities than would be possible under State ownership. In the long run, as the timber and other resources are brought into use with improving markets, the States will receive from the 25 per cent of the gross receipts now allowed them and the additional 10 per cent appropriated for road improvements a larger amount than would come in from local taxes under private ownership.

5. The States are not as well prepared, financially or otherwise, to handle the National Forests as is the Federal Government. If the Forests were owned by the States and handled in the real interests of the public, there would be substantially the same system of administration as today, at a greater aggregate cost for supervision by a considerable number of independent State staffs of technical men. The financial burden would be far too great for the individual States to assume. The result would be either poor administration and lack of protection, or a sacrifice of the public interests in order to secure revenue to meet the financial needs.

6. The successful application of forestry demands a stable administrative policy for long periods. This can be secured far better under National than under State control.

7. A much higher standard of constructive and technical efficiency is possible under National than under State administration. The value of the Forests to the public depends directly on the skill with which scientific knowledge is applied to the task of developing their highest productiveness. Both in ability to carry on the research work required for practical ends and in ability to command professional services of the first order the Government possesses a striking advantage.

8. As largely undeveloped property the Forests need heavy investments of capital for their improvement. Their full productiveness can be secured in no other way. The Government is now investing yearly in the Forests a considerable part of the appropriation made for them. Even if the States did not seek to make them sources of immediate revenue, at whatever sacrifice of their future possibilities, they would be reluctant to expend much for their development.

9. The States both lack the civil service system and standards of the National Government and are exposed to greater danger of being swayed by private interests. In the hands of spoilsmen demoralization would quickly succeed the present high standards of the Forest Service, while the intimate relation of the Forests to the welfare of greater numbers of individuals would tend to make their administrative control a highly coveted political prize. At the same time the value of their resources would certainly arouse a cupidity which would be exceedingly difficult to control. Scandalous maladministration might easily follow. The Federal Government is better watched, farther removed from local influence, more stable, and better equipped with a non-political system and machinery.

The underlying purpose of the proposed transfer of the National Forests to the States is really not to substitute State for Federal control but rather to substitute individual for public control. Its most earnest advocates are the very interests which wish to secure such control. The object of the whole States Rights movement as it affects the National Forests is to transfer to private

owners for speculative or monopolistic purposes public resources of enormous value. Retention of these resources under public ownership is needed to protect the people from abuses which are every day being demonstrated on lands over which the public has already lost control. The proposition is one which the people as a whole would repudiate in an instant if they understood what is proposed. The only danger lies

in the fact that some legislation adverse to the National Forest system may be passed when the public as a whole is ignorant that it is planned or does not understand the meaning. Vigilance in the defense of its interests and intelligence in the perception of the true character of masked attacks upon those interests are of fundamental necessity if the public is to protect itself.

LACK OF CHRISTMAS TREES

PRICES of Christmas trees in New York, Philadelphia, Baltimore, Washington and most of the cities and towns of the eastern and middle states will likely be higher this year than ever before owing to the great reduction in the regular supply due to a quarantine order of the Department of Agriculture. This went into effect on November 25 and prevents Christmas trees and greens from nearly all of New England being shipped out of the quarantine zone. This is due to the prevalence of the gypsy moth and the brown tail moth in New England and the fear of the Forest Service that they might be spread throughout the east by the indiscriminate shipping of conifers such as spruce, fir, hemlock, pine juniper and arbor vitae used generally, as they are, for Christmas trees and greens.

The gypsy moth is prevalent in Maine, New Hampshire, Massachusetts and Rhode Island, while the brown tail moth is in Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island.

The quarantine also applies to all forest plant products in the specified area. Of course, if officials of the Department of Agriculture examine proposed shipments of Christmas trees, greens or other forest products and pronounce them free from either of the destructive moths the shipments outside the quarantined area may be made, but there is little prospect that the thousands of dealers in Christmas trees will take the chances of buying these trees for shipment out of New England,

when the danger of the trees being condemned is so great.

For many years the shipment of Christmas trees and greens from New England has been a profitable industry and most of the supply to the larger cities of the middle states came from that section. Consequently the quarantine will greatly reduce the supply, and prices will naturally advance considerably.

The Forest Service upholds the Christmas tree custom, but recognizes at the same time, that the indiscriminate cutting of evergreens to supply the holiday trade has produced a bad effect upon many stands of merchantable kinds of trees in different sections of the country. Waste and destruction usually result when woodlands are not under a proper system of forest management. Foresters say that it is not by denying ourselves the wholesome pleasure of having a bit of nature in the home at Christmas that the problem of conserving the forests will be solved, but by learning how to use the forests wisely and properly. The ravages through forest fires must be checked, the many avenues of waste of timber in its travel from the woods to the mill and thence to the market must be closed, and almost numberless important problems demand attention before the Christmas tree.

Germany is conceded to have the highest developed system of forest management of any country, yet its per capita use of Christmas trees is great. The cutting of small trees for Christmas is not there considered in the

least as a menace to the forest, but, on the contrary, as a means of improving the forest by thinning and as a source of revenue. It is therefore constantly encouraged.

There is little doubt but that the time will come when the Christmas tree business will become a recognized industry in this country, and that as much attention will be given to it as will be given to the growing of crops of timber for other uses. This time may not be far off, for it is already understood that only through the practice of forestry, which means both the conservation of the timber which remains and carefully planned systems of reforestation, will it be possible to supply the country with its forty billion feet of lumber needed each year, as well as the few million little trees used at Christmas time.

Practically all conifers can be and are used as Christmas trees in this country, but the most popular ones are the firs, spruces, pines and the cedars. The pines are in great demand for Christmas trees when fir and spruce are not available, or are only to be had at a high price. Throughout Maryland and Virginia, and in Washington, the Virginia pine and, to a lesser extent, the cedar supply the demand. The fir is abundant in Colorado, but it grows in high, inaccessible places, and therefore the Douglas spruce and the lodgepole pine are more often used. The lodgepole pine is also popular in Wyoming and other Rocky Mountain states. In California it is not uncommon to find the incense cedar and young coast redwoods used as Christmas trees.



QUESTIONS AND ANSWERS

Many of our readers frequently desire to secure some expert advice regarding various features of forestry work, and do not know to whom to apply for the information.

The Editor has accordingly decided to establish this column in which he will be glad to publish such questions as may be sent to him, and give the answers, whenever the questions relate to any detail of the work which this Association is doing or such information as it can give.

The Editor requests that communications be written on one side of the paper only and if possible, be typewritten.

Asheville, N. C.

EDITOR AMERICAN FORESTRY.—Will you kindly recommend some book describing the trees and shrubs of North Carolina?

ALLEN G. MILLER,

Dr. J. K. Small's "Flora of the Southern States" describes all of the trees and

shrubs which Mr. Miller is likely to meet with in North Carolina, but this work is not illustrated. The only work I know of containing illustrations is one entitled Britton and Brown's "Illustrated Flora of Northern United States." This, however, is a rather expensive work. I do not know of any sufficiently exhaustive publication with illustrations and descriptions of shrubs in the region referred to.

Dr. C. S. Sargent's "Manual of Trees of North America" and Dr. N. L. Britton's "Forest Trees of North America" are both compact illustrated works which would serve Mr. Miller. Dr. Sargent's work would probably meet his needs best for trees, as it contains all of the information he desires on these plants.

Very truly yours,

GEO. B. SUDWORTH,

U. S. Forest Service.

COMING MEETINGS

Officials of forestry, lumber, timberland and fire protection associations are invited to send to AMERICAN FORESTRY notices of their meetings to be published in this column.

December 2-3—Western Forestry & Conservation Association, Seattle, Wash.

December 3—Northwestern Hardwood Lumbermen's Association, Minneapolis, Minn. Annual meeting.

December 4-6—National Rivers & Harbors Congress, New Willard Hotel, Washington, D. C.

December 7—North Central Missouri Retail Lumber Dealers' Association, Moberly, Mo.

December 18—Lumber Manufacturers' Association of Southern New England, Williamantic, Conn. Monthly meeting.

January 6-7—Meeting of Eastern Foresters' Association, at Lakewood, N. J.

January 8—Annual Meeting, American Forestry Association, at Washington, D. C.

January 9-10—Conference of State Foresters under auspices of the Forest Service, at Washington, D. C.

January 14-16—Nebraska Lumber Dealers' Association, Rome Hotel, Omaha, Nebr. Annual meeting.

January 14-16—Northwestern Lumbermen's Association, Minneapolis, Minn. Annual meeting.

January 15—Third annual convention, North Carolina Forestry Association, at Raleigh, N. C.

January 21-23—Ninth annual convention American Wood Preservers Association, Hotel Sherman, Chicago.

January 21-23—Ohio Association of Retail Lumber Dealers, Cleveland, Ohio.

January 21-23—Union Association of Lumber and Sash and Door Salesmen, Cleveland, Ohio. Annual meeting.

January 21-23—Colorado & Wyoming Lumber Dealers' Association, Denver, Colo. Annual meeting.

January 22-24—Southwestern Lumbermen's Association, Kansas City, Mo. Annual meeting.

January 29-30—Retail Lumber Dealers' Association of the State of New York, Hotel Utica, Utica, N. Y. Annual meeting.

January 29-30—Pennsylvania Lumbermen's Association, Hotel Walton, Philadelphia, Pa. Annual meeting.

February 4—Canadian Lumbermen's Association, Ottawa, Ont. Annual meeting.

February 5—Canadian Forestry Association, Ottawa, Ont. Annual business meeting.

February 13-15—Western Retail Lumbermen's Association, Masonic Temple, Spokane, Wash. Annual meeting.

STATE NEWS

Rhode Island

Arrangements have been perfected to secure the co-operation of the rural mail carriers in reporting forest fires to the wardens in Rhode Island. Several towns have just appointed committees and appropriated money for the establishment of fire lookout stations. Over 160,000 trees, representing about 75 species, have been planted this year in Warwick, Cranston, East Greenwich and Pawtucket. A survey of the natural resources of the State is in progress by Professor C. W. Brown, under the general direction of the State Conservation Commission, of which the Commissioner of Forestry is a member.

In the town of Glocester a gigantic seedling chestnut of great age was felled, when out jumped a menagerie including a raccoon, gray squirrel, flying squirrel, screech owl and insects.

Maine

There is a movement on foot to reorganize and revive the Maine Forestry Association, which has been practically defunct for the past four or five years. It is the intention to have this organization take an active part in having the present appropriation for forestry in Maine increased by the next Legislature, so as to put the work on a more substantial basis.

Pennsylvania

Aside from the general reserve and department work, there is nothing of special importance taking place in the forestry work in Pennsylvania at the present time. The department has under contract and will have turned over to the State in a month or so enough land to bring the reserve area to the million-acre mark.

Recently a number of small forest fires have occurred within the State, and it is very likely, now that hunting season has opened, that we may expect quite a few fires. With our protection of reserves we have reason to expect that these fires will not reach large size, and with the interest which sportsmen themselves are taking, and with the assistance of the fire wardens all over the State, as well as the boy scouts, there is no reason why fires outside of the reserves should reach large size. Thus far the State has been comparatively free of any serious fires this year.

Kentucky

Kentucky joins the front ranks of the States interested in the Forestry move-

ments. A movement which has been under way for the last ten years in Kentucky for the establishment of a forest policy within the State was crystallized into Law at a meeting of the Legislature during the winter 1910 and 1911, when a State Board of Forestry and the office of a State Forester were created. The Law which was enacted is a very far-reaching and intelligent law, and credit for this must be given to the Kentucky Federation of Women's Clubs.

Governor James B. McCreary has interested himself very extensively in this movement for the creation of the State Board of Forestry, and also for other progressive conservation measures which were enacted in the Law last winter. In accordance with this law, a State Board of Forestry was appointed by the Governor, and at a meeting in the latter part of August, a State Forester was appointed. This appointee was Mr. J. E. Barton, who has been connected with the U. S. Forest Service for the last seven years and who for the last four years has been Supervisor of the Pend Oreille National Forest in Northern Idaho. Mr. Barton took charge of the work on the first of September, and the work of organization under the law is going steadily forward. The people of Kentucky are manifesting a deep interest in the forest movement within their State, and it is expected within a comparatively short time that forest reserves will be created as demonstrations of forestry as a business and a science, and that nurseries will be furnished to provide stock for planting on the forest reserves and for the people of the State. One nursery will be started on the State Fair grounds at Louisville.

As an evidence of the interest of the people of the Commonwealth in forestry was the enthusiasm shown in connection with the planting of the Arboretum on November 13, on the grounds back of the State Capitol at Frankfort, Ky., which is the first arboretum on public grounds to be established in the United States. Eventually each county will be represented by a tree. Arbor Day was celebrated at the same time as the planting of the arboretum, and a large number of the State officials took an active part in the work.

Massachusetts

As was stated in the November number of AMERICAN FORESTRY, the Massachusetts Legislatures of 1911 and 1912 passed a resolve submitting to the people a proposed amendment to the Constitution giving to the General Court authority to prescribe the methods of taxing wild or forest lands. Through the efforts of a committee appointed by the Bos-

ton Chamber of Commerce and Massachusetts Forestry Association, working jointly in urging upon the voters of the State the importance of the proposed amendment as a means of encouraging forestry in Massachusetts, it was adopted at the recent election by an overwhelming majority. The personnel of the committee referred to is: Chairman, Harold Parker, ex-chairman of the Massachusetts Highway Commission; F. W. Rane, Massachusetts State Forester; Prof. Spencer Baldwin, professor of economics, Boston University; F. E. Olmstead, of the forestry firm of Fisher, Bryant & Olmstead; Allen Chamberlain, president of the Appalachian Mountain Club, and Mr. Harris A. Reynolds, secretary of the Massachusetts Forestry Association. This committee meets semi-monthly, and is now engaged in the rather difficult task of preparing a bill to present to the next session of the Legislature, which if enacted into law, it is hoped will eliminate many of the objectionable features of the present methods of taxing wild and forest lands, and become an important factor in stimulating the reforestation work in Massachusetts, as well as conserving the present wooded areas.

In order to obtain definite information with regard to the general practice of Massachusetts assessors in appraising values on such lands, as well as to determine, if possible, what effect any change in the present methods of taxation would have upon the revenues of cities and towns of the State, Mr. Harold O. Cook and Mr. Harry F. Gould, of the State Forester's office, have, at the request of the committee, selected five towns located in widely separated parts of the State in which they will make very careful estimates of the true values of the wooded areas, as compared with the valuation placed upon them by the assessors, and get such other information as may aid the committee in their work.

The United States Bureau of Plant Industry is co-operating with the State of Massachusetts in its efforts to check the chestnut bark disease. At present a bulletin is being prepared, which, it is hoped, will lead to increased demands for assistance on the part of the Massachusetts public. A number of examinations have been made during the past year for owners of chestnut woodland who suspect the presence of the disease. Up to date, while the State Forester has paid the salary of the examiner, his traveling expenses have been charged to the applicant. Through the co-operative agreement now entered into, these expenses will also be paid, and the owner will thus obtain his advice absolutely free. It is intended to undertake certain experiments with respect to the disease, some scouting will be done independent of applications for inspection, and steps may be taken toward the eradicating of the disease in some localities. The general outlook with regard to the disease is more hopeful than at this time last year. It is true that it has spread during the past summer, but

by no means to the extent that was expected. It seems reasonable to suppose that vigorous efforts on the part of woodland owners may be able to preserve their chestnut almost indefinitely, at least in the eastern portion of the State, where the attack is least severe.

Alabama

At the next session of the Alabama Legislature Game and Fish Commissioner John H. Wallace, Jr., will present a bill looking to converting all State lands, whether held in fee or in trust, by the State of Alabama, into game refuges and forest preserves. Included in these lands are the Sixteenth Section School Lands, the Tax Redemption Lands and the Swamp and Overflowed Lands, amounting to hundreds of thousands of acres. Since these lands belong to the State they have been regarded generally as being public property, the depredation on them in the way of the stealing of timber, firing of forests and slaughtering of game has been horrible in the past.

Mr. Wallace contemplated having a paid game and forest warden service to guard these lands. The movement has met with universal approval in Alabama, and the plan will undoubtedly be enacted into a law as soon as the Legislature shall meet.

North Carolina.

The third annual convention of the North Carolina Forestry Association will meet in Raleigh on January 15, 1913. Its discussions will be largely devoted to showing the immediate need for the passage of legislation for the protection of the forests of the State. There is a strong and growing feeling throughout the State that the time has arrived for action, and this Legislature is expected to make at least a small appropriation for inaugurating such protective work.

At the last meeting of the North Carolina Forestry Association a legislation committee was appointed to draw up a forest law for the State, to be presented to, and if possible passed by, the next Legislature, which convenes early in January. This committee is called to meet some time in December to put the bill which they have been working upon in final shape so that it may be introduced during the early days of the session. This law will probably provide for some kind of firewarden system, and will also attempt to assist the railroads in the prevention of railroad fires.

At a recent meeting of the Southern Furniture Manufacturers' Association, held in High Point, N. C., an appeal was made by the Secretary of the North Carolina Forestry Association, who was present by invitation, for the co-operation and assistance of the furniture manufacturers in the campaign to procure adequate forest protective laws for the State. A resolution was passed commending the work of the Forestry Associa-

tion and calling upon the Legislature to enact laws which will better control the individual who starts forest fires; which will enforce stricter regulations controlling railroads and other companies or individuals using spark-producing engines; which will empower some already existing state organization, or create some new state system, to enforce such laws; and which will provide an adequate appropriation to carry them into effect. Similar resolutions have been already passed by several of the chambers of commerce and other commercial bodies of the State.

Oregon

Oregon has just passed through the most successful fire season of which there is record. Aside from three crown fires which occurred in May before the fire season had really opened, and before the field force employed by the State and private timber owners was in the field, practically no timber was destroyed. These early fires were caused by carelessness in burning slashings located adjacent to standing timber, and could easily have been avoided if proper precautions had been taken by the people during the burning. The damage to timber in 1912 was less than the loss of 87,622 feet B.M. in 1911, and 1,978,841 feet B.M. in 1910. This result is due chiefly to the effectiveness of the work of the Forest Service, the Wardens employed by the State and the Patrolmen in the employ of the private timber owners. Considerable credit must also be given to a marked change in the attitude of campers, hunters and others relative to care with fire when in woods. One of the decidedly encouraging features in our work during the past season was the organization of additional county fire patrol associations. Five associations were formed during the year, bringing the total number of such organizations up to ten. The area covered by them totalled approximately 6,300,000 acres. In seven of the counties covered by fire patrol associations, the County Supervising Warden employed by the State Forester also acted as manager and directed the work of the association. This arrangement gave the State Forester immediate supervision of the fire protection work over a relatively large portion of the timber section of the State.

The need of a map of Oregon showing the cover of lands in the State which should be protected from fire, has long been felt by the State Forester. The work of obtaining data for such a map was started during the fall by placing eleven men in the field in the Northwestern section of the State. These men were instructed to prepare a map of the district assigned to them, showing the following information:

1. Location of land bearing merchantable timber, whether old or second growth.
2. Location of land covered with brush.
3. Location of cut-over land bearing unmerchantable second growth.

4. Location of all other cut-over land.
5. Location of old burns bearing unmerchantable second growth.
6. Location of burned areas not included under class 5.
7. Location of land used primarily for agricultural and grazing purposes.

It is expected that this data covering approximately the Northwest quarter of the State will be available about January 1, and just as soon as possible thereafter a lithograph forest cover map, on a scale of $1\frac{1}{2}$ " to the township, will be published. The remainder of the State will be worked over during the coming year and a complete cover map will be issued just as soon as possible. The information that will be shown on a map of this kind will be of immense value to the State Forester in connection with the fire protection work and especially in locating fire patrol districts.

Maryland

An effort is being made in Maryland to promote the planting and care of road-side trees. The State has expended several millions of dollars in the last few years for improved roads and the work is being continued, with the prospect that the whole State will, in a few years, be traversed by a system of improved highways. The greatest interest in tree planting has been shown by small towns, and their good influence is extending out into the rural sections. Illustrated talks are being given, showing the greater attractiveness of highways outlined by rows of trees, as contrasted with roads along which there are no trees. The State also proposes to establish a forest nursery, a portion of which can be devoted to the growing of trees suitable for planting along road sides. An effort is being made to secure a suitable law which will be administered by some central head, and not left entirely to local authorities, in order that there may be uniformity in the methods to be pursued, proper trees selected for planting and their arrangement made harmonious.

The plan is meeting with general approval wherever presented and the prospect is exceedingly good for securing a model road side tree law from the next Legislature, in January, 1914.

Michigan

Negotiations between the Forest Service and the Public Domain Commission of the State of Michigan are under way for the exchange of certain National and State forest lands. Such exchange is made possible by a law recently enacted by Congress, the object of which is to enable the Government to more completely solidify its holdings within the boundaries of the National Forests in Michigan. A State law, of similar purport, giving the State of Michigan authority to exchange lands with the Federal Govern-

ment, as well as with individuals, has been in force for more than a year. The lands involved comprise some 25,000 or 30,000 acres, located principally in the counties of Luce, Crawford, Roscommon, Gosco and Oscoda.

Wisconsin

The Wisconsin State Board of Forestry now has about 2,500,000 seedlings and transplants in the main forest nursery at Trout Lake, which is in the heart of the State Forest Reserves. As will be noted from the following table, the cost of raising the planting material has been kept down to a very reasonable figure.

1 YEAR SEEDLING.

	Number	Cost to raise per M.
White pine -----	632,000	\$.46
Scotch pine -----	190,000	.45
Western yellow pine---	60,000	.55
Norway spruce -----	11,000	1.06
Colorado blue spruce--	40,000	.40
European larch -----	400	.88

2 YEAR SEEDLINGS.

	Number	Cost to raise per M.
White pine -----	436,000	\$.47
Norway pine -----	576,000	.47
Scotch pine -----	145,000	.46
Western yellow pine---	13,000	.56
Norway spruce -----	20,000	1.07

2 YEAR TRANSPLANTS.

	Number	Cost to raise per M.
White pine -----	21,000	\$1.25
Scotch pine-----	20,000	1.24
Western yellow pine ---	68,000	1.33

Ohio

The city of Cincinnati during the past few years has come into possession of about fifteen hundred acres of land either within the city limits or contiguous thereto.

State Forester Secrest was consulted recently regarding its use, and made the suggestion that a portion or all be devoted to a forest park, modelled somewhat after the city forest parks of Germany. This plan met with the unanimous approval of the Board of Park Commissioners. A co-operative agreement was entered into, whereby the State Forestry Department is to draw up plans, and supervise the planting and improvement work. Arrangements have been made for establishing a nursery on one of the tracts, where about 200,000 trees will be placed the coming spring.

The proposed work at Cincinnati offers a most excellent opportunity for the establishment of demonstration forests, and especially for initiating the scheme of city forest parks. The areas contain some native woodlots in

culled conditions, but there are some fine specimens of original forest trees including oaks, beech, maples, tulip, poplars, gums, basswood, walnut, etc.

The work will be along the line of practical forestry. In the planting operations as many different kinds of tree species will be used as seem adaptable to conditions.

The ornamental features will not be considered, but the plantings will be so placed as to enhance the aesthetic value. It is intended to reserve open park areas, especially where groups of the original oaks and beech stand. The topography and general aspect of the land offers splendid opportunity for visitors, and this feature will not be overlooked. The woodlots will be reconstructed whenever possible, but it is proposed to reserve as many of the old trees as may seem practical.

This undertaking is probably the first of its kind in this country, and it is hoped that other cities will soon follow the Cincinnati plan.

Vermont

The University of Vermont has decided definitely that it can best subserve the interests of the State by teaching forestry as a branch of modern farming, rather than in training up a small group of highly specialized foresters, most of whom would have to seek positions outside the State. Forestry conditions in this country are such that it will be impossible for a forester to earn a salary that will repay him for a four years' college course, on a forest tract of less than 10,000 acres. There are at present very few private tracts of this kind upon which foresters are employed; and the number does not bid fair to increase in proportion to the number of technically trained foresters. In fact, with the present tendency on the part of Congress to scrimp in its appropriation for the National forests, and other constructive work, in favor of increased pensions and other vote-getting measures, there seems to be an imminent danger of lack of employment for newly trained foresters.

On the other hand, there is an ever-increasing demand on the part of large land-owners for trained farm managers. More and more these men will be required to have a working knowledge of timber estimating and such silvicultural measures as thinning and planting. In connection with intensive agriculture a graduate of an agricultural college can find remunerative employment on a few hundred acres, and the student with some forestry knowledge will find that he has a decided advantage in obtaining such positions over one who has no knowledge of forestry.

Many of the graduates of an agricultural college go back to their own farms, and in the long run the knowledge which they have acquired along forestry lines will help them to prosperity. When lumber has greatly increased in value over its present value, the

farmer who has conserved his woodlot will look back gratefully to his college course in forestry. Many of these men later become members of the State Legislatures, and their influence for sound forestry principles, inculcated while at college, will go far toward counteracting the hasty, ill-considered forestry legislation, which is a most threatening feature of the present forestry situation.

The State University cannot confine its work to teaching within its walls, and extension work among the people of the State is most important. There is at present a bill before the Legislature of Vermont to provide for agricultural extension on the part of the State University. It is very much to be desired that this bill shall pass and that forestry extension may be carried on as a part of the new work.

For the sake of students desiring to specialize in forestry, and in other scientific professions, a science course has been adopted in the University of Vermont which will enable a student to take all the work required for admission in any professional forest school. Any student who can complete this work in three years with one-half of his marks of (B) grade, and none below (C) grade, may obtain his degree of bachelor of science after the satisfactory completion of his first year in a forest school of recognized standing.

California

The State of California depends upon a voluntary firewarden system for the protection of its vast timber resources. The firewardens are public-spirited citizens who have the conservation of our forests at heart. They have the powers of a peace officer to arrest without warrant for violations of the forest laws. They rendered very efficient assistance during the calendar year of 1912, and up to November 1 made 39 arrests. The cases were prosecuted by Justices of the Peace and the District Attorneys. Convictions were secured in 29 cases; in 1 case the offender was acquitted; 3 were released; 2 dismissed; in 2 cases the fines were suspended, and in another case, because of extenuating circumstances, the offender was placed on probation for six months in lieu of a fine.

A favorable public sentiment against forest fires has grown steadily. It has been shown, however, that the maximum efficiency has been obtained through the efforts of the voluntary firewardens. It is apparent that the fire situation can be successfully handled only through the maintenance of a paid State patrol, and toward that end an effort will be made to secure the necessary appropriation at the coming Legislature.

A Forestry Club has been organized at the University of California for the purpose of securing an appropriation from the Legislature for the creation of a forestry department. There is a membership of about forty earnest students from the botany and agricultural departments. They hold regular bi-weekly meetings and secure such speakers as they can to address them upon forestry and allied subjects. They have succeeded in interesting members of the Faculty in their undertaking. All of these students wish to follow forestry as a profession, but many of them feel that they prefer to receive their training in the West rather than in Eastern universities.

The field for practical work and observation in California is unsurpassed by other States. Conservative forestry is being conducted on 20 national forests where the students can work during the summer months. Their milling, logging and other practical work can be obtained upon the large holdings of the timber companies within a comparatively short distance of the University campus.

The conservation of our natural resources can here be assured by the practice of forestry principles on private holdings which comprise three-fourths of the entire timbered area. By training California men here on the ground it is probable that, through their connection with timber interests, they will eventually apply their knowledge of forestry principles in the management of the forests of our State. Every assistance should be given the members of the Forestry Club in their endeavor to secure an appropriation to establish a Department of Forestry at the University of California.

TO HEAD A RANGER SCHOOL

F. B. Moody, assistant State Forester of Wisconsin, visited the New York State College of Forestry, Syracuse University, recently. Mr. Moody is a graduate of the Forestry School of the University of Michigan and has been connected with the State work in Wisconsin for the last six years. On January 1, Mr. Moody will take up his duties as head of the Ranger School to be established by the State Forest Service and the University of Wisconsin. The Ranger School is similar in scope to that conducted by the New York State College of Forestry at Wanakena.

NEWS NOTES

At Cornell University

The faculty of the Department of Forestry at Cornell has just been increased by the appointment of Mr. Arthur B. Recknagel as professor. Mr. Recknagel graduated from Yale College in 1904, and from the Yale Forest School in 1906. He has been engaged in many kinds of work in the U. S. Forest Service, and is at present an Assistant District Forester in District 3. The plan of the forestry course at Cornell is that each student is to devote the fifth year of his college work to advanced study or research along the lines in which he wishes to specialize. Accordingly, each member of the faculty is expected to offer advanced work in one line. Mr. Recknagel will develop forest management as his specialty. As a part of the work in forest management, he will have charge of the eight weeks of work in camp which will be given the graduate students in the spring term. For the present, Mr. Recknagel will also teach lumbering and wood technology.

It is expected that ground will be broken very soon for the forestry building at Cornell, as the contract has just been let. The building will include three laboratories for wood technology and timber testing; laboratories for silviculture, mensuration, dendrology and utilization; a lecture room with an automatic window-darkening apparatus to facilitate the use of lantern slides; class-rooms, a reading room, seminar, forestry club room, museum, drafting room and a series of offices. There will also be a locker room, freight room, instrument room and tool room. The building is to be ready for occupancy sometime during the college year 1913-14. At present the Department of Forestry is occupying a laboratory, class room and offices in one of the recently finished buildings of the College of Agriculture.

The Department has just issued an announcement of its work, containing full details as to the plan of the course.

Dr. Hamilton's New Position

Dr. Frederick W. Hamilton, recently President of Tufts and Jackson Colleges, has re-entered the business field, from which he withdrew several years ago for professional work as an educator, and has taken the position of General Manager of the American Forestry Company.

As a young man, Dr. Hamilton's successful business career, combined with his broad

education, early brought him to the front. For many years he was a trustee of Tufts College and later became its President, keeping at the same time other high positions in the educational world, including membership of the Massachusetts State Board of Education.

The success and rapid growth of the American Forestry Company, with its "Little Tree Farms," open a field of unusual opportunity to a man of Dr. Hamilton's caliber, in the combination which forestry offers of the commercial and the aesthetic, and it is, therefore, with much enthusiasm that Dr. Hamilton has associated himself with the Company, and taken up his new duties.

This affiliation will allow Mr. Theodore F. Borst, Forest Engineer of the Company, to devote his energies more exclusively to the professional side of the prosperous industry of which he was the founder.

Dr. Hamilton will from now on make his headquarters at the offices of the American Forestry Company at 15 Beacon Street, Boston, Mass.

The American Forestry Company is to be congratulated upon obtaining the services of a man who has made a marked success in the fields both of business and education.

New Forest Reserves.

Following investigations which have been made by officers of the Canadian Forestry Department, it is proposed to set aside a number of new forest reserves. The largest is on the shores of Lesser Slave Lake, and comprises 4,788 square miles. About 350,000,000 feet of lumber is available there, and the reservation is recommended because of the unsuitability of the land for agricultural purposes and the necessity of conserving a timber supply for the future.

North of Lake la Biche, Alberta, another reserve is suggested. In Saskatchewan a reserve has been recommended at Fort a la Corne, while one in Manitoba is likely to be established. It is intended to extend considerably this year the pine forest reserve north of Prince Albert, and also those in British Columbia.

CURRENT LITERATURE

MONTHLY LIST FOR NOVEMBER, 1912

(Books and periodicals indexed in the Library of the United States Forest Service)

Forestry as a Whole

Weber, Heinrich, editor. Jahresbericht über die fortschritte, veröffentlichungen und wichtigeren ereignisse im gebiete des forst—jagd—und fischereiwesens für das jahr 1911; supplement zur Allgemeinen forst—und jagd-zeitung, 186 p. Frankfurt am Main, J. D. Sauerländer's verlag, 1912.

Bibliographies

Cockrill, Elizabeth. Bibliography of Tennessee geology, soils, drainage, forestry, etc. 119 p. Nashville, 1911. (Tennessee Geological Survey. Bulletin 1 B.)

Proceedings and reports of associations, forest officers, etc.

Great Britain—Commissioners of woods, forests and land revenues. 90th report. 119 p. London, 1912.

St. Petersburg—Lyesnoi institut (Forest institute). Izvestiya (Contributions), vol. 23. 163 p. pl. St. Petersburg, 1912.

Société dendrologique de France. Bulletins. no. 21-24. Paris, 1911-12.

Société forestière de Franche-Comté et Belfort. Bulletin trimestriel, v. 11, no. 7. 132 p. Besançon, 1912.

Straits Settlements—Conservator of forests. Annual report on forest administration for the year 1911. 23 p. Singapore, 1912.

Forest Aesthetics

Street and park trees

Gaylord, F. A. Shade trees. 69 p. il., pl. Albany, N. Y., 1912. (N. Y.—Conservation commission—Division of lands and forests. Bulletin 7.)

New Jersey—Forest park reservation commission. The planting and care of shade trees, by Alfred Gaskill, including papers on Insects injurious to shade trees, by John B. Smith, and Diseases of shade and forest trees, by Mel. T. Cook. 128 p. il., pl. Trenton, N. J., 1912.

Newark—Shade tree commission. Eighth annual report, 1911. 68 p. il. Newark, N. J., 1912.

North Carolina—Geological and economic survey. Planting street trees. 4 p. Chapel Hill, 1912. (Press bulletin no. 57.)

Forest Description

Foster, J. H. Forest conditions in Louisiana. 39 p. il., pl. Washington, D. C., 1912. (U. S.—Dept. of agriculture, Forest service. Bulletin 114.)

Holmes, J. S. A forester's notes from Europe; Switzerland. 3 p. Chapel Hill, N. C., 1912. (N. C.—Geological and economic survey. Press bulletin no. 85.)

Moon, F. Frank. Forest conditions of Warren county. 31 p. pl., map. Albany, N. Y., 1911. (N. Y.—Conservation commission—Division of lands and forests. Bulletin 6.)

Stephen, John Wallace. Forest conditions of Oneida county. 20 p. pl., map. Albany, N. Y., 1911. (N. Y.—Conservation commission—Division of lands and forests. Bulletin 4.)

Forest Botany

Trees; classification and description

Arnold arboretum. Bulletins of popular information, nos. 29-31. Jamaica Plain, Mass., 1912.

Clements, Frederic E. and others. Minnesota trees and shrubs; an illustrated manual of the native and cultivated woody plants of the state. 314 p. il., pl. Minneapolis, University of Minnesota, 1912.

Japan—Dept. of agriculture and commerce—Bureau of forestry. Icones of the bamboos of Japan, with 15 plates. 73 p. and portfolio of plates. Tokyo, 1912.

West Laurel Hill cemetery. List of trees and shrubs in West Laurel Hill cemetery. 48 p. il. Philadelphia, Pa., 1911.

Silvics

Studies of species

Woodbury, T. D. Yield and returns of blue gum (Eucalyptus) in California. 8 p. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 210.)

Silviculture

Planting

United States—Dept. of agriculture—Forest service. Extracting and cleaning forest tree seed. 23 p. Wash., 1912. (Circular 208.)

Forest Protection*Insects*

Mason, E. B. The southern pine beetle and its control. 4 p. Chapel Hill, 1912. (N. C.—Geological and economic survey. Press bulletin 60.)

Diseases

Giddings, N. J. The chestnut bark disease. 19 p. il. Morgantown, 1912. (W. Va.—Agricultural experiment station. Bulletin 137.)

Pennsylvania chestnut tree blight commission. The chestnut blight disease; means of identification, remedies suggested, and need of co-operation to control and eradicate the blight. 9 p. pl. Harrisburg, 1912. (Bulletin 1.)

Pennsylvania chestnut tree blight commission. Treatment of ornamental chestnut trees affected with the blight disease. 7 p. pl. Harrisburg, 1912. (Bulletin 2.)

Animals

MacRae, Hugh. The stock law and forest protection. 5 p. Chapel Hill, 1912. (N. C.—Geological and economic survey. Press bulletin 61.)

Fire

Adams, Daniel W. Methods and apparatus for the prevention and control of forest fires, as exemplified on the Arkansas national forest. 27 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 113.)

California—State board of forestry. Forest fire report and voluntary firewardens. 43 p. Sacramento, 1912.

Plummer, Fred G. Forest fires; their causes, extent and effects, with a summary of recorded destruction and loss. 39 p. il., pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 117.)

Forest Management*Forest mensuration*

Baughman, H. R. A. Baughman's buyer and seller. 12th edition. 300 p. Indianapolis, 1912.

Forest Economics*Taxation and tariff*

Pettis, Clifford R. Forest taxation. 19 p. Albany, N. Y., 1912. (New York—Conservation commission—Division of lands and forests. Bulletin 8.)

Statistics

United States—Dept. of agriculture—Bureau of statistics. Exports of farm and forest products, 1909-1911, by countries to which consigned. 100 p. Wash., D. C., 1912. (Bulletin 96.)

United States—Dept. of agriculture—Bureau of statistics. Imports of farm and forest products, 1909-1911, by countries

from which consigned. 83 p. Wash., D. C., 1912. (Bulletin 95.)

Forest Administration

United States—Dept. of agriculture—Forest service. October field program, 1912. 31 p. Wash., D. C., 1912.

Forest Utilization*Lumber industry*

Northern hemlock and hardwood manufacturers association. Birch, America's finest wood. 16 p. il. Wausau, Wis., 1912.

Pacific logging congress. Fourth annual session, Tacoma, Wash. 44 p. Chicago, American lumberman, 1912.

Southern logging association. Proceedings, 2d annual meeting. 54 p. il. New Orleans, Lumber trade journal, 1912.

Stailey, S. C., comp. Lumber inspection rules; containing rules governing the manufacture and inspection of different kinds of lumber, government tests of the comparative strength of building timbers, and other useful information for everyday use. 356 p. il. N. Y., A. D. Beeken, 1912.

Forest by-products

Betts, Harold Scofield. Possibilities of western pines as a source of naval stores. 23 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 116.)

Wood technology

Heim, A. L. Mechanical properties of redwood. 32 p. il. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Circular 193.)

Wood preservation

Weiss, Howard F. Prolonging the life of crossties. 51 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service. Bulletin 118.)

Auxiliary Subjects*Botany*

Correa, M. Pio. Flora do Brazil; algumas plantas uteis, suas applicações e distribuição geographica. 154 p. Rio de Janeiro Typographia da Estatistica, 1909.

Japan—Dept. of agriculture and commerce—Bureau of forestry. Illustrations of Japanese fungi. 12 p. pl. Tokyo, 1912.

Periodical Articles*Miscellaneous periodicals*

Agricultural gazette of Tasmania, Aug., 1912. —Western afforestation, by L. A. Evans, p. 313-16.

Agricultural journal of the Union of South Africa, Sept., 1912.—White ants in Natal; their nature and treatment, by Claude Fuller, p. 345-69; The willow tree caterpillar, *Angelia tyrrhea*, by C. B. Hardenberg, p. 397-418.

- American city, Aug., 1912.—Renourishing trees, by J. H. Prost, p. 127-8.
- Arizona, Oct., 1912.—Sheep industry in Arizona; its profits, losses and annual migration of the flocks, by Bert Haskett, p. 9-10.
- Botanical gazette, Oct., 1912.—Comparative anatomy of dune plants, by Anna M. Starr, p. 265-305.
- Breeder's gazette, Oct. 16, 1912.—Shade trees for farm homes, by D. C. W., p. 781-2.
- Breeder's gazette, Nov. 6, 1912.—The cypress trees in Washington, by Joseph E. Wing, p. 967.
- Country gentleman, Aug. 31, 1912.—Forestry, a farm problem, p. 1; Making the most from pine orchards, by Charles Davis, p. 4; The emergency silo; stove types that can be built quickly, by Charles Dillon, p. 21.
- Country gentleman, Sept. 28, 1912.—Asphalt as a wood preserver, by N. E. Thatcher, p. 19.
- Country gentleman, Oct. 12, 1912.—The influence of the forest on the land, by Enos T. Mills, p. 3-4, 24.
- Country life in America, Sept. 1, 1912.—Sound, sick and crippled trees, p. 36.
- Country life in America, Oct. 15, 1912.—Interior wood treatments, the best woods for interior trim, how to finish them, and what it costs, by Phil M. Riley, p. 55-7.
- Craftsman, Oct., 1912.—Cypress; its picturesque qualities and how to finish it, p. 114-5.
- Gardeners' chronicle, Sept. 14, 1912.—Forests and rainfall, p. 214.
- Gardeners' chronicle, Sept. 28, 1912.—Reclaiming sand dunes in Belgium, by A. D. Webster, p. 243.
- Gardener's chronicle, Oct. 5, 1912.—Forest surveys, by G. W., p. 261; Afforestation in the Black country, p. 290-2.
- Independent, Oct. 10, 1912.—Celebrated and historic trees, by J. G. Wilson, p. 828-36.
- Journal of the association of engineering societies, Sept., 1912.—Forestation and its relation to flood waters of the lower Mississippi river, by W. B. Gregory.
- Nature, Aug. 29, 1912.—Forests and rainfall, p. 662-4.
- Pine cone, Oct., 1912.—Products of the northern pine forests, p. 3-7.
- Plant world, Nov., 1912.—The phylogeny of grasses, by William H. Lamb, p. 264-9.
- Quarterly journal of economics, Aug., 1912.—Group of trusts and combinations, including the lumber trust, by W. S. Stevens, p. 630-41.
- Scientific American, Oct. 19, 1912.—Source of commercial divi divi, p. 325.
- Scientific American supplement, Sept. 14, 1912.—Some experiments on the hydrolysis of sawdust; sugar and alcohol from wood, by Wallace P. Cohoe, p. 166-7.
- Technical world magazine, Nov., 1912.—Log driving in the desert, by Nelson L. Le Grand, p. 311-22.
- Torrey, Oct., 1912.—On the origin and present distribution of the pine-barrans of New Jersey, by Norman Taylor, p. 229-42.
- Trade journals and consular reports*
- American lumberman, Oct. 19, 1912.—Uses of tupelo gum or bay poplar, p. 25; Black walnut defended, p. 43; Poplar conservation; the people's co-operation with lumbermen an essential, p. 45; The electric log haul, by C. D. Cole, p. 50-1; Diseases of wood, p. 64.
- American lumberman, Nov. 2, 1912.—Disposing of slash, by E. T. Allen, p. 44.
- American lumberman, Nov. 9, 1912.—Cigar box wood, p. 40.
- Barrel and box, Oct., 1912.—Identification of trees, p. 45; Packing house cooperage woods, p. 46; White oak in tight cooperage, p. 47.
- Canada lumberman, Oct. 15, 1912.—Forest conditions in Quebec province, by G. C. Piche, p. 34-35; A forestry students' camp, by R. B. Miller, p. 38-9; Preventing waste in forest products, by E. J. Palmer, p. 39-40; Cost of manufacturing wooden boxes, p. 42-4.
- Canada lumberman, Nov. 1, 1912.—The economy of artificial drying of lumber, p. 28-9; New Brunswick timberland situation, p. 30-2.
- Engineering news, Oct. 31, 1912.—Correction tables for strengths of commercial size timbers, by R. C. Hardman, p. 826; Controlling the Mississippi river, by C. McD. Townsend, p. 832-5.
- Engineering Record, Sept. 7, 1912.—Bending tests with wood executed at the Danish state testing laboratory, Copenhagen, p. 269.
- Hardwood record, Oct. 25, 1912.—Silver or soft maple, p. 23-4; Uses and supply of kauri pine, by L. L. D., p. 24; A remarkable logging railroad, by H. H. G., p. 25-8; Satinwoods of commerce, p. 32-3; Crosstie evolution, by G. D. C., p. 38-9; Fancy woods for floors, p. 39.
- Hardwood record, Nov. 10, 1912.—Lodgepole pine, p. 23-4; New system of quarter-sawing, p. 24-5; River birch for cooperage, by S. J. Record, p. 25; Bird peck in hickory, by S. J. Record, p. 27; The wood of the ashes, by S. J. Record, p. 28-9; Hardwoods used for matches, p. 29; Uses for blight killed chestnut, by S. J. Record, p. 32-3; Willow, a new substitute wood, p. 35-6.
- Lumber world review, Oct. 10, 1912.—Paper on creosote oil, by Hermann von Schrenk, p. 24-5.
- Lumber world review, October 25, 1912.—Overhead system of rough ground logging, by Fred R. Olin, p. 18-19; The Port Reading creosoting plant, p. 28-30.
- Lumber world review, Nov. 10, 1912.—Hardwoods that are largely used in treated railroad ties, by Bruce Odell, p. 19; Electric hauling in logging operations, by C. O. Cole, p. 20-1; Treatise on the

- structure of wood, by R. S. Kellogg, p. 22-3; Historical developments of wood preserving in the United States, by E. A. Sterling, p. 24-6.
- Mississippi Valley lumberman, Nov. 1, 1912.—Louisiana timber conservation tax, p. 30-1.
- Paper, Oct. 16, 1912.—What the government is doing in forestry, by Henry Solon Graves, p. 15-16, 38; From tree to pulp and paper; story of the wood-pulp industry; forms of pulp and modes of preparing it for news print, p. 17-19, 38.
- Paper, Oct. 23, 1912.—Lectures on cellulose, by C. F. Cross, p. 23-4.
- Paper, Oct. 30, 1912.—Laces, yarns and textiles from wood-pulp, p. 15; The popular in the Ticino valley, by Enrico Pirola, p. 19-22.
- Paper, Nov. 13, 1912.—Modern pulp and paper mills in Norway, p. 17-20, 41; Aspects of the resin and wood-pulp industries, by J. F. Briggs, p. 21-2.
- Pioneer western lumberman, Nov. 1, 1912.—The California redwood lumber industry, by J. R. Newsom, p. 11-13.
- Pulp and paper magazine, Oct., 1912.—Development of chemical wood-pulp industry in Sweden and reclaiming of by-products, by C. E. Bandelin, tr., p. 314-20.
- St. Louis lumberman, Oct. 15, 1912.—The lumberman's viewpoint, by E. G. Griggs, p. 55-6; Michigan agricultural college forestry summer term, p. 62-3.
- St. Louis lumberman, Nov. 1, 1912.—The silo, the high cost of living, and the lumberman, by J. F. Goodman, p. 54 B-C; The stone trees of Arizona; a forest gone to sleep, by Charles F. Lummis, p. 54 G; Dwarf larch and spruce, p. 54 G; Some Philippine woods, by H. N. Whitford, p. 63.
- Southern Lumber journal, Oct. 15, 1912.—Forest taxation and the preservation and perpetuation of our wood lands, by Leonard Bronson, p. 42.
- Southern lumber journal, Nov. 1, 1912.—The taxation of timber holdings, p. 25-6.
- Southern lumberman, Oct. 19, 1912.—The present status of forestry in Tennessee, by Henry W. Lewis, p. 29-30.
- Southern lumberman, Nov. 2, 1912.—For clearing land; novel stump burner manufactured in Washington state, p. 42.
- Timber trade journal, Oct. 5, 1912.—Circulation of sap and growth of trees, by S. M., p. 471-2.
- Timberman, Oct., 1912.—Oregon agricultural college to add logging engineering to curriculum, p. 25-6; Cableway system is successfully utilized in interior British Columbia, p. 27; The University of Montana offers full and short courses in forestry, p. 40; Successful 20th annual session of National irrigation congress, p. 48 F; The nation and the states in forestry, by Henry Solon Graves, p. 48 G-H.
- United States daily consular report, Nov. 6, 1912.—Greenheart piling and Guiana timber, by Rea Hanna, p. 672-3.
- United States daily consular report, Nov. 7, 1912.—Scandinavian pulp-mill stones, by Henry Bordewich and others, p. 689-92; Sawmill refuse to heat and light city, by G. C. Woodward, p. 695.
- Wood craft, Nov., 1912.—Preparation and hauling of lumber for woodworkers, p. 49-50; Circulation of sap and growth of trees, p. 61-2.
- Forest journals*
- Boletín de bosques, pesca i caza, Sept., 1912. El progreso forestal de Bosnia i Herzegovina, by Federico Albert, p. 145-53; El primer ensayo de una estadística forestal de Chile, by Federico Albert, p. 154-9; Los eucaliptos que deben plantarse, by Federico Albert, p. 164-82.
- Bulletin de la Société centrale forestière de Belgique, Oct., 1912.—Le blanc du chene, by G. Quéritet, p. 577-88; La feuillaison et le développement des plants élevés à l'ombre ou à la lumière chez le hêtre et quelques autres essences feuillues, by A. Poskin, p. 597-604; La République Argentine au point de vue physique, by Francisco Latzina, p. 604-12.
- Canadian forestry journal, July-Aug., 1912.—The British Columbia forest act, p. 83-91; Experiment needed in pulp-making, by H. R. MacMillan, p. 92-7; Government forests in Saxony, by W. G. Wright, p. 105-8; The aspen tree in the northwest, by A. Knechtel, p. 109; Export of Christmas trees, p. 110.
- Forest leaves, Oct., 1912.—Some benefits of the chestnut blight, by S. B. Detwiler, p. 162-5; How private forestry can be brought about, by S. B. Elliott, p. 165-8; Planting operations in the Bear Meadows division of the Center co. reserve, Pa., by Walter D. Ludwig, p. 168-70; Planting timber trees, by J. Linn Harris, p. 170-1; Public or private forestry, by E. A. Zeigler, p. 173-5.
- Forstwissenschaftliches centralblatt, Sept.-Oct., 1912.—Forstliche wirtschaftsbezw. bestandesübersichtskarten, by Knauth, p. 480-90; Forstliches aus Baden, by E. Fieser, p. 490-505.
- Hawaiian forester and agriculturist, Sept., 1912.—Forest reserves; reports of the Supt. of forestry making recommendations with regard to three forest reserves, by Ralph S. Hosmer, p. 263-81.
- Indian forester, Oct., 1912.—List of the trees, shrubs and economic herbs of the southern forest circle of the C. P., by H. H. Haines, p. 495-509.
- Ohio forester, July, 1912.—Propagating shade and forest trees in the nursery, by E. W. Mendenhall, p. 7-8; The hickory, by J. J. Crumley, p. 8-10.
- Quarterly journal of forestry, Oct., 1912.—The forests of Formosa, by H. J. Elwes, p. 267-79; Forty years' management of woods, by D. Tait, p. 279-98; The for-

- estry exhibition at the Doncaster show of the Royal agricultural society of England, by J. C. Blofield, p. 329-33.
- Revue des eaux et forêts, Sept. 15, 1912.—Notes forestières d'Amérique; République Argentine, by G. Lapie, p. 545-50; Conifères; essais de tableaux dichotomiques pour la détermination des espèces, by L. Pardé, p. 550-2.
- Revue des eaux et forêts, Oct. 1, 1912.—Traitement du pin sylvestre dans la région de Paris, p. 577-86; Notes forestières d'Amériques; Chile, Paraguay, Venezuela, Amérique centrale, by G. Lapie, p. 586-93.
- Revue des eaux et forêts, Oct. 15, 1912.—Notes forestières d'Amérique; Mexique, p. 619-24.

- Tharandter forstliches Jahrbuch, 1912.—Ueber die anstellung waldbaulicher versuche und über die klassen der forstlichen ertragstafeln, by Vater, n. 252-63; Die ausbildung der forstreferendare, by Martin, p. 293-308; Zwingen bedenken gegen die fichtenkahlschlagwirtschaft in Sachsen zu einem fruchtwechsel, by Deicke, p. 309-35; Ueber die anwendung graphischer rechnungsmethoden in der forstwissenschaft, by Hegershoff, p. 340-72.
- Zeitschrift für forst- und jagdwesen, Sept., 1912.—Ein neues vegetationshaus und seine praktische erprobung, by A. Möller, p. 527-38; Ueber den einfluss der streuentnahme, by A. Schwappach, p. 538-58; Die wälder Australiens, p. 637-41.

THE ANNUAL MEETING

THE annual meeting of the American Forestry Association will be held in Washington, D. C., on Wednesday, January 8th, and notification will be sent to members in the course of a few days. As many important plans for work of vital interest for the new year are to be arranged, it is desired that there shall be a much larger attendance than usual, and it is hoped there will be.

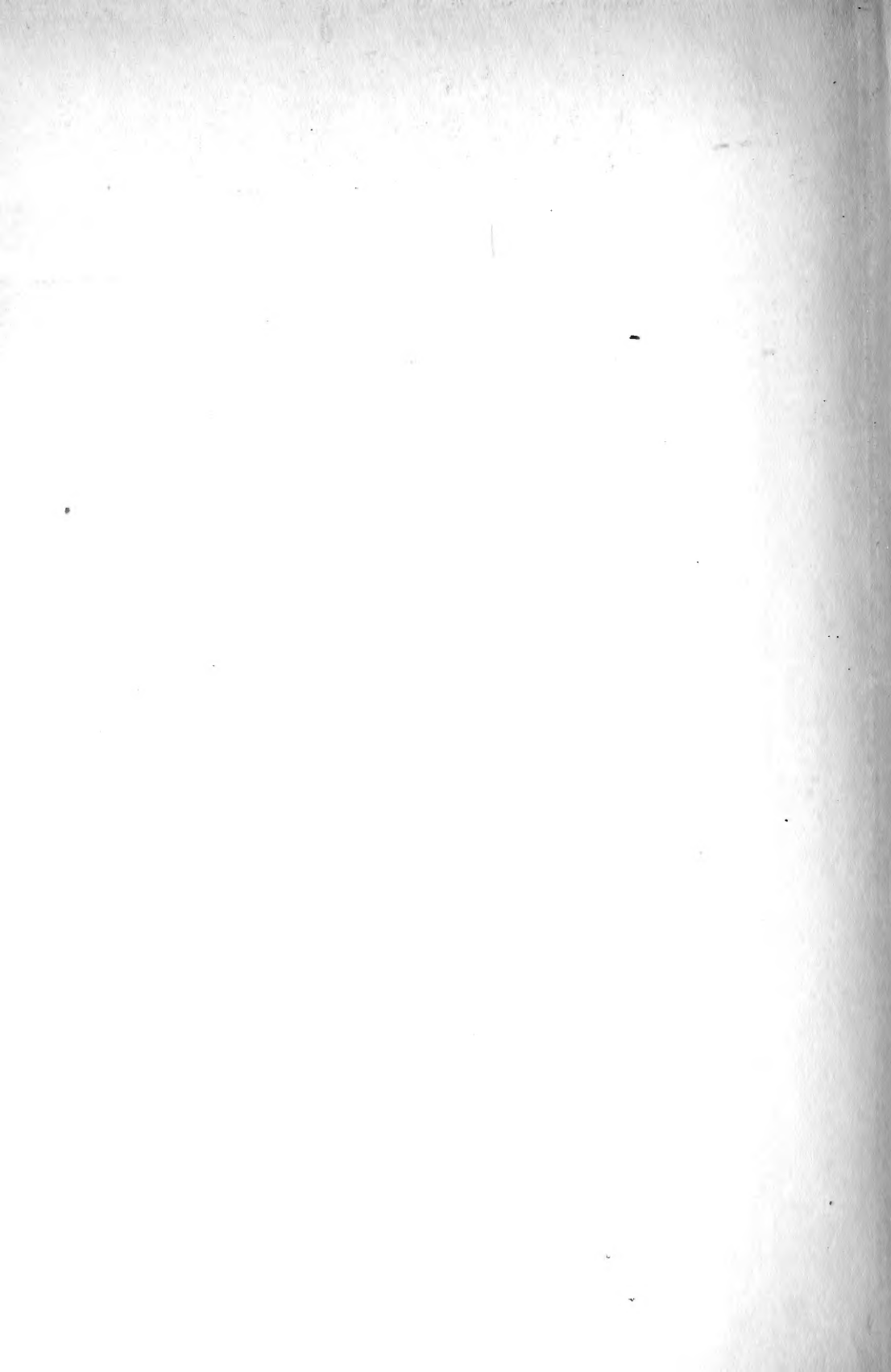
The date having been selected just as this edition goes to press it is impossible, at this time, to announce the de-

tails of the gathering, these having not yet been decided.

A meeting of the Eastern Foresters will be held at Lakewood, N. J., on Tuesday and Wednesday, January 6 and 7, and most of them are expected to attend the American Forestry Association meeting. This is to be followed on January 9 and 10 by a conference of state foresters and others under the auspices of the Forest Service, so that the week, all told, will be a most important one for forestry.

TIMBER CONSERVATION

In a bulletin recently issued, Secretary Wilson, of the Department of Agriculture, calls attention to the fact that the State of Louisiana, ranking second in its wealth of timber only to the Pacific Coast States, will have cut all of its 199 billion feet of lumber in thirty years at the present rate of consumption unless it begins a plan of conservation and reforestation. He says: "With efficient protection of this young growth, and better utilization of the present commercial stands, the forests of Louisiana, even in the face of a much greater agricultural development than now, should remain an important source of wealth."



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